Vol. 938 Number 2

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

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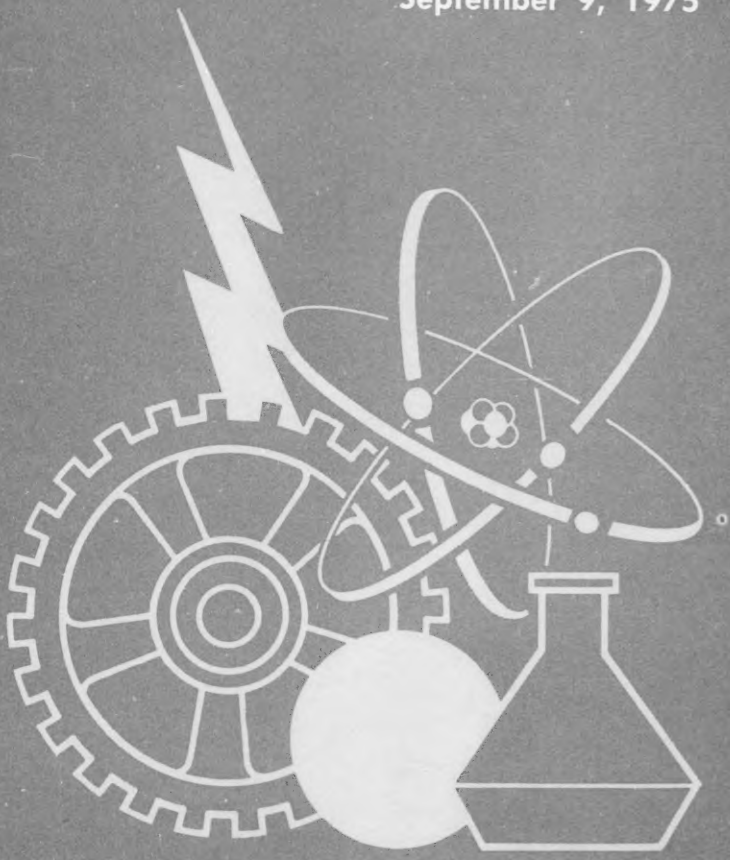
PATENTS

September 9, 1975



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

September 9, 1975 Volume 938 Number 2

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Certificates of Correction for the Week of Sept. 9, 1975

D. 234,649	3,848,031	3,870,669	3,886,140
Re. 28,383	3,849,050	3,870,825	3,886,196
Re. 28,391	3,849,310	3,871,149	3,886,331
3,355,440	3,850,883	3,871,819	3,886,533
3,678,098	3,851,268	3,871,822	3,887,274
3,729,475	3,852,062	3,871,948	3,887,583
3,737,416	3,852,279	3,872,236	3,887,656
3,740,312	3,852,470	3,872,451	3,887,707
3,742,851	3,853,899	3,872,646	3,887,770
3,744,891	3,853,945	3,873,213	3,887,930
3,747,679	3,853,995	3,873,747	3,888,149
3,754,270	3,855,046	3,873,911	3,888,170
3,763,126	3,855,198	3,874,356	3,888,277
3,763,196	3,856,814	3,874,409	3,888,344
3,764,262	3,857,464	3,874,880	3,888,509
3,772,117	3,858,450	3,875,358	3,888,522
3,774,777	3,858,758	3,876,439	3,888,569
3,786,296	3,859,593	3,876,496	3,888,675
3,786,851	3,859,964	3,877,091	3,888,898
3,798,234	3,860,563	3,878,087	3,888,903
3,803,269	3,860,573	3,878,192	3,889,066
3,803,372	3,860,820	3,878,278	3,889,514
3,804,890	3,862,185	3,878,284	3,889,892
3,807,966	3,862,365	3,878,773	3,890,036
3,817,980	3,862,942	3,879,032	3,890,104
3,825,608	3,863,097	3,879,341	3,890,174
3,830,794	3,864,394	3,879,992	3,890,675
3,831,358	3,864,897	3,880,957	3,890,703
3,832,345	3,865,542	3,880,990	3,890,982
3,832,352	3,865,608	3,881,974	3,891,056
3,832,841	3,865,883	3,882,119	3,891,268
3,836,299	3,867,729	3,882,772	3,891,302
3,837,945	3,868,537	3,883,313	3,891,420
3,839,207	3,868,993	3,884,287	3,891,636
3,839,513	3,869,270	3,884,779	3,891,970
3,841,957	3,869,293	3,884,845	3,892,003
3,846,385	3,869,371	3,885,245	3,892,796
3,847,182	3,870,666	3,886,017	3,893,579

Disclaimers and Dedications

3,837,601.—*James Byron Cole,* Mercer Island, Wash. AERODYNAMIC SLOT CLOSING MECHANISM. Patent dated Sept. 24, 1974. Disclaimer and dedication filed July 14, 1975, by the assignee, *The Boeing Company.*

Hereby disclaims and dedicates to the Public claim 1 of said patent.

3,872,407.—*Richard Swart Hughes,* China Lake, Calif. RAPIDLY TUNABLE LASER. Patent dated Mar. 18, 1975. Disclaimer and dedication filed June 17, 1975, by the assignee, *the United States of America, as represented by the Secretary of the Navy.*

Hereby disclaims and dedicates to the Public the entire remaining term of said patent.

Dedications

3,783,005.—*John Thomas Kenney,* Lawrence Township, Mercer County, N.J. METHOD OF DEPOSITING A METAL ON A SURFACE OF A NONCONDUCTIVE SUBSTRATE. Patent dated Jan. 1, 1974. Dedication filed Apr. 1, 1975, by the assignee, *Western Electric Company, Incorporated.*

Hereby dedicates to the Public the entire remaining term of said patent.

3,846,290.—*Richard L. Raymond,* Wilmington, Del. RECLAMATION OF HYDROCARBON CONTAMINATED GROUND WATERS. Patent dated Nov. 5, 1974. Dedication filed Aug. 1, 1975, by the assignee, *Sun Ventures, Inc.*

Hereby dedicates to the Public all claims of said patent.

Disclaimers

Re. 27,096.—*Arthur Polden Walker,* Whitley Bay, England. DETERGENT COMPOSITION. Patent dated Mar. 23, 1971. Disclaimer filed June 10, 1974, by the assignee, *The Procter & Gamble Company.*

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 of said patent.

2,911,330.—*Harold E. Clark,* Penfield, N.Y. MAGNETIC BRUSH CLEANING. Patent dated Nov. 3, 1959. Disclaimer filed May 19, 1975, by the assignee, *Xerox Corporation.*

Hereby enters this disclaimer to claims 1–5 of said patent.

3,166,155.—*Henry B. Clark,* Elizabeth, N.J. MOTOR OPERATED FIRE DOORS WITH AUTOMATIC DOOR RELEASE. Patent dated Jan. 19, 1965. Disclaimer filed July 7, 1975, by the assignee, *Mesker Industries, Inc.*

Hereby enters this disclaimer to claims 1, 2, 5, 6, 8, 10, 13 and 14 of said patent.

3,604,870.—*Victor E. De Lucia,* Los Angeles, Calif. MAGNETICALLY OPERATED ENVELOPE ENCLOSED HIGH VOLTAGE RELAY. Patent dated Sept. 14, 1971. Disclaimer filed Apr. 16, 1975, by the assignee, *Torr Laboratories, Inc.*

Hereby enters this disclaimer to claim 1 of said patent.

3,699,089.—*Otto Wichterle,* Prague, Czechoslovakia. ANHYDROUS SPARINGLY CROSS-LINKED HYDROPHILIC COPOLYMERS. Patent dated Oct. 17, 1972. Disclaimer filed Mar. 12, 1975, by the assignee, *Ceskoslovenska akademie Ved.*

The term of this patent subsequent to Jan. 2, 1985, has been disclaimed.

3,755,881.—*Sheldon S. White,* Brookline, *Henry Ty,* Attleboro, *Jacob L. Ornstein,* Norton, and *Wesley V. Dudovicz, Rene A. Dubuc,* and *Joseph E. Clark,* Attleboro, Mass. METHODS FOR MAKING EDGELAY THERMOSTATIC BIMETALS. Patent dated Sept. 4, 1973. Disclaimer filed June 18, 1975, by the assignee, *Texas Instruments Incorporated.*

Hereby enters this disclaimer to claim 1 of said patent.

3,757,575.—*Robert P. Murphy, William W. Owens,* and *Dwight L. Dauben,* Tulsa, Okla. WELL-LOGGING METHOD. Patent dated Sept. 11, 1973. Disclaimer filed Aug. 14, 1975, by the assignee, *Amoco Production Company.*

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5, 6, 11, 12 and 13.

3,805,044.—*Ranendra K. Bhattacharyya,* Kendall Park, N.J. and *Angelo Ralph Fiore, Jr.,* Westville, and *David William Rudd,* East Derry, N.H. COMPUTERIZED PROCESS CONTROL SYSTEM FOR THE GROWTH OF SYNTHETIC QUARTZ CRYSTALS. Patent dated Apr. 16, 1974. Disclaimer filed July 15, 1975, by the assignee, *Western Electric Company, Incorporated.*

Hereby enters this disclaimer to claim 24 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner
WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF AUGUST 16, 1975

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-17-75
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur: Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	10-18-74
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Fore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	12-17-74
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	11-4-74
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	11-7-74
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures: Illumination: Horology; Acoustics; Recorders; Weighing Scales.	12-4-74
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition: Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	7-25-74
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	11-20-74
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-23-75
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	12-3-74
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-6-74
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-2-75
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools: Cutlery; Jacks.	1-2-75
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	1-6-75
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	11-27-74
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	1-22-75

Expiration of patents: The patents within the range of numbers indicated below expire during September 1975, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,849,714 to 2,854,668 inclusive
Plant Patents..... Numbers 1,746 to 1,757 inclusive

REISSUES

SEPTEMBER 9, 1975

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 28,547

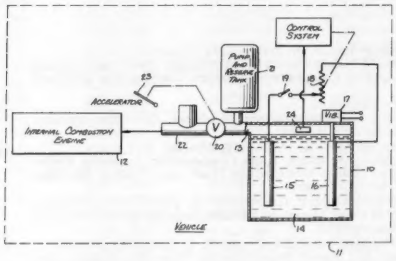
GAS-OPERATED INTERNAL COMBUSTION ENGINE

Francisco Pacheco, Hewitt, N.J., assignor to Michael Ebert; E. J. Kalil; A. Rosen; P. Clark and C. J. Girone, a part interest to each

Original No. 3,648,668, dated Mar. 14, 1972, Ser. No. 53,112, July 8, 1970. Application for reissue Oct. 24, 1973, Ser. No. 409,259

Int. Cl. F02b *43/00*; **H01m** *17/02*

U.S. Cl. 123—3 **14 Claims**



1. A gas-operated internal-combustion engine adapted to drive a vehicle and having a carburetor, comprising:

A. a gas generator mounted on said vehicle, said generator including a tank having a salt-water electrolyte and a magnesium electrode suspended in said electrolyte to cause hydrogen to evolve in the tank,

B. adjustable means coupled to said generator to vary the rate at which hydrogen is evolved in said tank,

C. means to feed hydrogen from said tank into said carburetor to intermix with air to produce a combustible mixture,

D. means to supply said mixture to the cylinders of said engine,

E. means to sense the amount of hydrogen consumed by the engine to produce a control signal as a function thereof, and

F. means responsive to said control signal to operate said adjustable means whereby the amount of hydrogen evolved is not substantially in excess of that required by the engine.

Re. 28,548

METHOD AND REAGENTS FOR THE DIAGNOSIS OF VIRAL DISEASES

Joseph Zichis, Rancho Santa Fe, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Original No. 3,777,014, dated Dec. 4, 1973, Ser. No. 112,039, Feb. 2, 1971. Continuation-in-part of Ser. No. 786,770, Dec. 24, 1968, abandoned. Application for reissue Oct. 7, 1974, Ser. No. 512,615

Int. Cl.[2] **G01N** *31/00*, *33/16*

U.S. Cl. 424—12 **3 Claims**

1. The method of preparing an antigen from animal or fowl blood for use as a serological reagent which comprises:

separating the erythrocytes from said blood to remove plasma and anticoagulant;

treating the erythrocytes with an isotonic aqueous solution having a pH of about seven and containing [sodium, chloride and] borate ions [,] *and* boric acid, and a preservative;

incubating the resulting mixture of erythrocytes and isotonic solution at about 2° to 4° C. for about 8 to 23 days; and

separating the resulting stable serologically active white-grayish antigen from the residual liquid and blood substances.

PLANT PATENTS

GRANTED SEPTEMBER 9, 1975

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,779

ROSE PLANT

William A. Warriner, Tustin, Calif., assignor to Jackson and Perkins Company, Medford, Oreg.

Filed Sept. 6, 1974, Ser. No. 503,778

Int. Cl. A01h *5/00*

U.S. Cl. Plt.—20 **1 Claim**

1. A new and distinct cultivar of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a well branched, vigorous plant, nearly round leaflets, short, blunt buds that open into very double imbricated blooms of a color near Wilson's Vermilion with little or no fragrance.

3,780

ELM TREE

Eugene B. Smalley, Cottage Grove, and Donald T. Lester, Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed May 31, 1974, Ser. No. 474,903

Int. Cl. A01h *5/12*

U.S. Cl. Plt.—51 **1 Claim**

1. A new and distinct variety of elm tree as herein described and illustrated primarily characterized by its high resistance to Dutch elm disease.

PATENTS

GRANTED SEPTEMBER 9, 1975

ERRATA

For CLASS	See PATENT NO.
228-121	3,903,585
228-190	3,903,586
057-119	3,903,689
119-018	3,903,851
138-148	3,903,931
092-052	3,903,416
023-298	3,904,520
250-369	3,904,530
250-444	3,904,531
250-483	3,904,532
261-064	3,904,722
427-122	3,904,752
424-304	3,904,773
191-012	3,904,840
235-051	3,904,853
235-054	3,904,854

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PATENTS

GRANTED SEPTEMBER 9, 1975

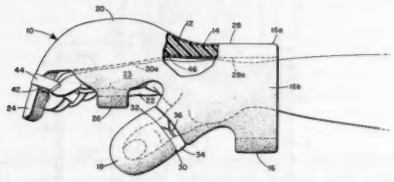
GENERAL AND MECHANICAL

3,903,546

PROTECTIVE GLOVE FOR THE HAND

Jhoon Goo Rhee, 2525 N. Ridgeview Rd., Arlington, Va. 22207

Filed May 10, 1974, Ser. No. 468,681
Int. Cl.² A41D *13/10;* **A63B** *71/14*
U.S. Cl. 2—16 **5 Claims**



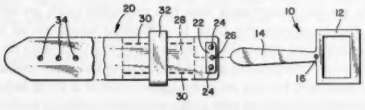
1. A flexible, unitarily molded, protective glove for wearing and use in the art of karate and the like, and adapted to cover the back and sides of the hand including the fingers and thumb and also the entire wrist, comprising a rear portion having a wrist portion, a side portion, and a thumb portion including securing means, and a front portion having a thickened portion, a looped portion, and a finger portion including securing means; said wrist portion comprising encircling means adapted to surround the wrist; said side portion extending from the side of said rear portion and opposite said thumb portion; said thumb portion extending from the side of said rear portion and adapted to cover the back of the thumb; said looped portion extending from the sides of said thickened portion adapted to secure the glove across the palm of the hand and adapted to cover the sides of the hand; said finger portion extending forwardly of said thickened portion and adapted to secure the glove to fingers of the hand; said entire glove comprising resilient foam means covered with a tough surface casing; whereby said front portion and rear portions of the glove when worn on the hand are normally disposed in a finger extended position and whereby said front and rear portions are also capable of being folded together to form a fist.

3,903,547

REMOVABLE BUCKLE BELT

Barry Schiller, 911 Crestview Ave., North Woodmere, N.Y. 11581

Filed Aug. 8, 1974, Ser. No. 495,579
Int. Cl.² A41F *9/00*
U.S. Cl. 2—321 **14 Claims**



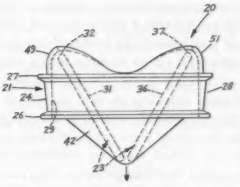
1. In a belt comprising a removable buckle having a strap receiving portion connected to a longitudinally extended appendage, and a strap having at one end an inwardly facing sheath, the appendage of said buckle being inserted in said sheath, the outer end of said strap being provided with at least one opening for receiving prong means, the improvement wherein said strap is provided, at said one end, with prong means projecting substantially perpendicularly from both inward and outward surfaces thereof, and said buckle is provided with prong receiving opening means whereby said buckle is attached to said strap by insertion of said appendage into said sheath with the inward facing prong means projecting through the prong receiving opening means in said buckle, and the outward facing prong means is available to pass through said at least one opening in said other end of said strap.

3,903,548

HEART VALVE WITH TWO VALVING MEMBERS

Ahmad Aref Nakib, Houd-el-Wilaya, Beirut, Lebanon

Filed May 14, 1973, Ser. No. 360,137
Int. Cl.² A61F *1/22;* **F16K** *15/02, 17/12*
U.S. Cl. 3—1.5 **19 Claims**

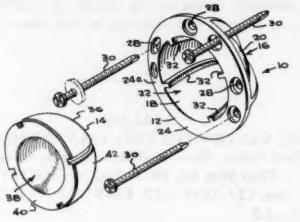


1. A heart valve for controlling the flow of blood comprising: base means having a passage with a blood inlet side and a blood outlet side through which blood can flow; a pair of valving disc means located generally within said passage for controlling the flow of blood through said passage, said disc means being the only obstruction to the flow of blood in said passage, each of said pair of valving disc means being smaller than said passage and movable to closed oppositely inclined positions to restrict the flow of blood through the passage in one direction and movable to open generally parallel positions to permit the flow of blood through the passage in the direction opposite the one direction, each of said valving disc means having opposite sides and an axis about which the valving disc means is free to rotate; and retaining means cooperating with the base means and valving disc means to hold the valving means in free floating relationship with the base means and retaining means, said retaining means having a first means on one side of said base and a second means on the other side of said base, said first means including members having two symmetrical pairs of interior guide surfaces to control coordinated transitory movement of the valving disc means and with the base means allow the valving disc means freedom to rotate about their axes as they move between the open and closed positions, one pair of interior guide surfaces cooperating with one valving disc means and the other pair of interior guide surfaces cooperating with the other valving disc means, said first means locating the valving disc means when in the open generally parallel positions in locations where blood flows adjacent the opposite sides of the valving disc means whereby blood washes the opposite sides of the valving disc means, said second means including means cooperable with the first means to locate the disc means in the passage.

3,903,549
ACETABULAR CUP PROSTHESIS COMPONENT FOR TOTAL OR SUBTOTAL HIP PROSTHESIS SYSTEM

William Minor Deyerle, 2222 Monument Ave., Richmond, Va. 23220

Filed June 12, 1974, Ser. No. 478,732
Int. Cl.[2] A61F 1/24
U.S. Cl. 3—1.912 16 Claims



1. An acetabular cup prosthesis assembly to be fixed on the acetabulum of a patient in connection with total or sub-total hip prosthesis surgery, comprising an integral unitary metal cup prosthesis component and a replaceable liner insert, the cup prosthesis component having a dome portion extending in a hemispherical path from a proximal end plane of the prosthesis formed of a substantially hemispherical metal wall having a convex spherical outer surface and a concave spherical inner surface defining a generally hemispherical cup socket having an entrance opening at said proximal end plane and having a diameter of predetermined greater size than the head of an associated femur or femoral prosthesis component to be located in said cup socket, said cup prosthesis component also including an annular rim flange extending radially outwardly from the end of said hemispherical metal wall at said proximal end plane defining an integral annular ring portion encircling said entrance opening to abut against surface portions of a recipient acetabulum and be secured thereto to locate and aid in supporting the cup prosthesis thereon, said dome portion including rotation and tilting resisting and liner retaining rib formations protruding radially inwardly from said spherical inner surface, said rib formations being formed of a pair of semicurclar ribs spanning the cup socket along meridians disposed in a pair of diametric planes intersecting at the zenith of the inner surface of said wall defining patterns of meridian rib segments extending from the entrance opening to the zenith intersection to present surfaces to the liner resisting tilting and rotation thereof in the socket and for frictionally retaining the liner seated in the socket, and the replaceable liner insert being formed of an integral molded body of plastic material of generally hemispherical configuration interfitted in said cup socket having an outer spherical surface conforming closely to the size and complementing the configuration of the inner spherical surface and meridian rib segments of the dome portion to restrain the liner insert in said cup socket by tight frictional interengagement therewith, and said liner insert having a concave spherical inner surface defining a liner socket of a diameter corresponding to the heads of the femur or femoral prosthesis to be located therein.

3,903,550
WATER CLOSETS

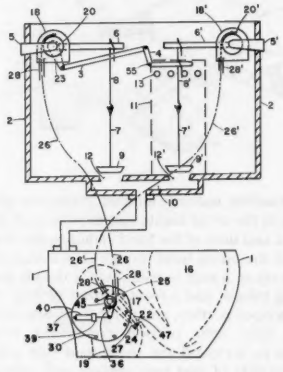
John Raymond Wilhelm, 11605 Split Rail Ct., Rockville, Md. 20852

Filed Oct. 25, 1972, Ser. No. 300,655
Int. Cl. E03d 1/22, 1/30
U.S. Cl. 4—34 10 Claims

1. A means to control the position of a valve which opens or closes a waterway through the weir of the trap of a specially configured water closet and to supply separate water quantity requirements to said water closet using the rotational motions of two flushing mechanisms on the face of the associated tank, said means comprising:

a. a flat support structure comprising a removable access plate member forming a part of the water closet bowl wall and constituting a mounting means for such trap valve shaft and the operating means thereof, said access plate also serving as a liquid and vapor sealing means for a corresponding access aperture in such bowl wall,

b. two sheath-enclosed flexible pull cables, each connected to and adapted to be actuated by a respective one of two tank-mounted flushing mechanisms for imparting appropriate motion to respective control devices of the water closet trap valve connected thereto,



c. two tank-mounted flushing mechanisms connected to respective ones of said pull cables to operate the same in conjunction with respective flush cycles initiated thereby,

d. a linkage within the water closet tank and interconnecting the two flushing mechanisms whereby one of the flush handles by a reverse rotation can initiate the operation of the other flush cycle, and

e. an interlocking linkage within the water closet tank and interconnecting the two said flushing mechanisms whereby a reverse rotation of one flush handle can temporarily preclude the subsequent functioning of the other handle.

3,903,551
TOILET FLUSHING ARRANGEMENT

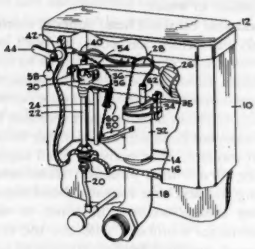
Arthur L. Johnson, 4921 Third St., San Francisco, Calif. 94124

Filed Nov. 4, 1974, Ser. No. 520,305
Int. Cl.[2] A61B 19/00; E03D 1/34, 5/02
U.S. Cl. 4—67 A 4 Claims

1. In a toilet water tank that has an outlet port, an arrangement for emptying the tank to different levels so as to discharge different amounts or water from the tank into the bowl of the toilet, comprising a first tube rising from the outlet port of the tank and having an open upper end at a level below the normal water level in the tank, a second tube branching off from the lower end portion of said first tube and having an open end at a level below the level of the open end of said first tube, individual cover means pivotably supported adjacent said open ends and yieldably biased to keep said open ends closed, means operable to lift said cover means individually from said open ends, and a pipe passing through and rising from one of said cover means to a level above the normal water level in the tank to act as an overflow drain.

3. A dual level flushing arrangement for the water tanks of toilets having two discharge ports located at different levels comprising individual cover means yieldably biased to keep

said ports closed, and means selectively operable to lift the cover means of said ports individually from said ports including a lever having a tubular pivot passing through the front wall of the tank and a handle bar located exteriorly of said tank, and means operatively connecting said lever to one of said cover means to lift it from its port upon depression of said



handle bar, an actuating chain connected to the other one of said cover means, guide means conducting said actuating chain to the end of said tubular pivot within said tank for the chain to pass through said tubular pivot to the outside, and an actuating convenience connected to the emerging end of said chain exteriorly of said tank.

3,903,552

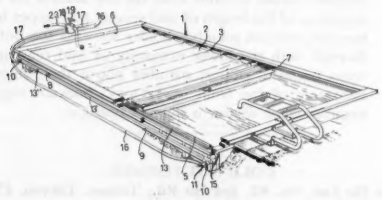
PROTECTIVE DEVICE FOR A BASIN

Leif Urban Erlandsson, Huddinge, and Lennart Roland Alsenhag, Sollentuna, both of Sweden, assignors to Pool Guard Inc. A.B., Stockholm, Sweden

Filed July 25, 1973, Ser. No. 382,324

Int. Cl.[2] E04H *3/19*

U.S. Cl. 4—172 **12 Claims**



1. A protective device for basins preferably having a quadratic or rectangular shape, comprising profiled parallel rails, tow rails extending laterally of said profiled rails, runners carried by said tow rails and running in said profiled rails, a flexible cover connected to said tow rails, tubes being mounted substantially parallel to said profiled rails, pistons slideably mounted in said tubes, ropes, each having two strands, each connected to an opposite end of one of said pistons and connected to one of said tow rails at one end of said cover, and means for moving said pistons in opposite directions to the movement of said one of said tow rails.

3,903,553

CONVERTIBLE SOFA-BED FURNITURE

Albert Metayer, Domaine du Raye, Genneteil, 49490 Noyant, France

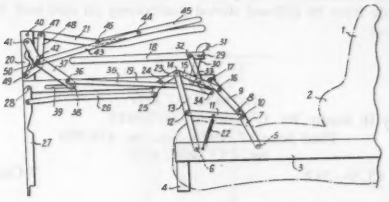
Filed May 28, 1974, Ser. No. 473,699

Claims priority, application France, May 28, 1974, 73.35554

Int. Cl.[2] A47C *17/14*

U.S. Cl. 5—36 **6 Claims**

1. A bed base for a piece of furniture adapted to be converted from a seat into a bed comprising a fixed frame, a main element, lever means pivotally connecting said main element to said frame and movable between a folded position in which said main element is inserted in said frame and an unfolded position in which said main element is moved from said frame to a horizontal position, a leg pivotally connected to said main element and capable of supporting said main element in its horizontal position, an intermediate element pivotally connected at its back end to said main element, a leg element pivotally connected at its back end to said intermediate element and movable between a folded position in which it is parallel to said main element and an unfolded position in



which said leg element is in prolongation of said main and intermediate elements, a second leg pivotally connected to said leg element capable of supporting said leg element in its prolonged position, a head element pivotally connected to the back end of said main element and when in its unfolded position being housed between said folded leg element and said main element and linkage means connecting said head element, main element, intermediate element and leg element and capable of automatically causing said head element to move from its folded position to an unfolded position in prolongation of said main element when said leg element is moved from its folded position to its unfolded position.

3,903,554

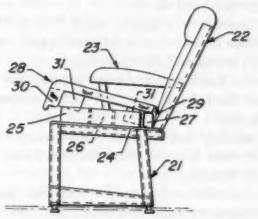
SEATING UNIT WITH REMOVABLE LIFE PRESERVER SECTION

Malcolm J. Dodd, Litchfield, Conn., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Dec. 19, 1973, Ser. No. 428,647

Int. Cl.[2] B63B *29/04*

U.S. Cl. 9—7 **4 Claims**



1. In combination with a vehicle seat structure having a seat base section, a seating unit incorporating a separate removable life preserver member as a part of the seat cushion base material to be supported from the seat base section which comprises, a removable, closed-cell foam life preserver section sized and shaped to be of smaller dimensions than the boundary of the seat cushion portion of the seating unit, additional closed-cell foam sections being of a size to fill in void portions of said life preserver section with respect to said boundary of said seat cushion portion of the seating unit, said closed-cell sections being of substantially uniform thickness, and providing resiliency for a resulting complete closed-cell foam seat cushion base of said seating unit, with said additional closed-cell foam sections on said seat base section bounding and forming an upwardly facing opening complementary in size to said life preserver section, and providing for

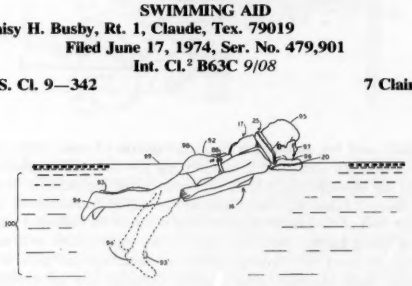
its non-attached placement therein on the seat base section, and a liftably attached seat cushion covering portion for said seating unit positioned over said additional closed-cell foam sections and said life preserver section and being non-attached to the latter, said liftable seat cushion covering portion having a layer of open-cell foam to provide improved seating comfort and being provided with a hinged attachment in interconnection with said seat to provide a resulting hingedly-movable cover portion over the life preserver section resting on said seat base section, whereby said life preserver section is readily liftable from its defined stored positioning on said seat base section.

3,903,555

SWIMMING AID

Daisy H. Busby, Rt. 1, Claude, Tex. 79019

Filed June 17, 1974, Ser. No. 479,901
Int. Cl.[2] B63C *9/08*
U.S. Cl. 9—342 **7 Claims**



1. A swimming apparatus comprising, in operative combination, a harness for attachment to the torso of a human wearer and an array of buoyant members, said buoyant members operatively held by said harness on the body of said wearer,

1. said array of buoyant members comprising a first lower torso buoyant support member, a second rear upper torso buoyant support member, a first rigid front buoyant head support member, and a second rigid rear buoyant head support member, said buoyant members each comprising a rigid waterproof low density flotation body;

2. said harness comprising

a. a first front lower torso buoyant support member holder and said first front lower torso buoyant support member held thereby,

b. a second rear upper torso buoyant support member holder and said second rear upper torso buoyant support member held thereby,

c. a first front buoyant head support member holder with said first front buoyant head support member held thereby,

d. a second rear buoyant head support member holder with said second rear buoyant head support member held thereby,

e. a first lower connector member joining the bottom portions of said first front and second rear buoyant torso support member holders, and

f. a pair of second upper connector members, each member of such pair operatively joined to a top portion of the first front lower torso buoyant support member holder and to a top portion of the second rear upper torso buoyant support member holder,

g. said harness extending downward from said upper connector member adjacent said wearer's neck to said lower connector member adjacent the crotch of said wearer when the wearer is in an erect position, and wherein

h. said first front buoyant head support member holder is movably yet firmly connected to both members of said pair of said second upper connector members by spaced apart front movable head support holder connecting means operatively connected to spaced apart portions of said first front buoyant head support member holder, and each said front buoyant head support member holder extends from said front movable head support holder connecting means in a direction transverse to a line connecting the said front movable head support holder connecting means where connected to said second upper connector members, whereby the front head support member holder extends to contact and support the wearer's chin when said wearer is in prone position in water,

i. said second rear buoyant head support member holder is movably yet firmly connected to both members of said second upper connector members by spaced apart rear movable head support holder connecting means operatively connected to spaced apart portions of said second rear buoyant head support member holder, and said rear buoyant head support member holder extends from said movable rear buoyant head support holder connecting means in a direction transverse to a line connecting the said rear movable head support holder connecting means where connected to said second upper connector members, whereby the rear buoyant head support member holder extends to contact and support the rear of wearer's head when said wearer is in water in supine position; and

3. said array of buoyant members arranged so that

a. said first rigid front lower torso buoyant support member held by said first front lower torso buoyant support member holder extends from the bottom thereof for only a portion of the length of said first front lower torso buoyant support member holder from its top towards its bottom and said lower torso buoyant support member having a center of buoyancy located closer to the bottom of said first front lower torso buoyant support member holder than to its top whereby to be applied against the front of the hips of the wearer when in prone position, and

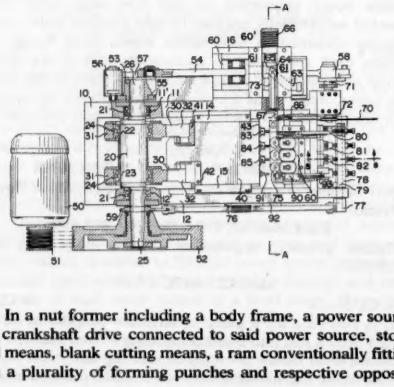
b. said second rear upper torso buoyant support member held by said second rear upper torso buoyant support member holder extends from the top thereof for only a portion of the length of said second rear upper torso buoyant support member holder towards the bottom thereof, with the lower extremity of said rear upper torso buoyant support member above the center of buoyancy of the front lower torso buoyant support member when wearer is in erect position.

3,903,556

COLD NUT FORMER

Yuan Ho Lee, No. 82, Jen Ho Rd., Tainan, Taiwan, China /Taiwan

Continuation-in-part of Ser. No. 401,419, Sept. 27, 1973, abandoned. This application May 30, 1974, Ser. No. 474,619
Int. Cl. B21d *53/24*
U.S. Cl. 10—76 R **4 Claims**



1. In a nut former including a body frame, a power source and crankshaft drive connected to said power source, stock feed means, blank cutting means, a ram conventionally fitting with a plurality of forming punches and respective opposed

forming dies conventionally coaxially related to said punches and cooperating with said punches to form respective laterally spaced blank forming stages equidistantly laterally spaced from one another and blank transfer clamp means for transferring cut blanks from said blank cutting means successively through said forming stages: ram drive means for reciprocating said ram and maintaining said ram laterally oriented in its reciprocating movement to assure delivery of an even impact force to said blanks to said respective forming stages comprising a longitudinally elongated crankshaft eccentric generally centered between the crankshaft ends; respective laterally aligned, body frame supported spherical bearings journalling said crankshaft outwardly of the opposite ends of said eccentric; respective spherical bearings mounted on the opposite ends of said eccentric; a pair of crank arms journalled on said last mentioned spherical bearings with the free arm ends of said crank arms connected to the laterally related opposite ends of said ram; and uniplanarly pivotable connection means connecting said free arm ends to said ram ends for assuring non-canted reciprocation of said ram.

3,903,557

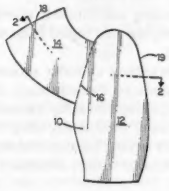
METHOD OF PREPARING A PROTECTIVE DEVICE FOR SAFETY SHOES

Raymond J. Howland, Jr., Windham, N.H., assignor to Safety, Inc., Boston, Mass.

Continuation of Ser. No. 434,267, Jan. 17, 1974, Pat. No. 3,845,576. This application Aug. 2, 1974, Ser. No. 494,380. The portion of the term of this patent subsequent to Nov. 5, 1991, has been disclaimed.

Int. Cl.[2] A43D *9/00*

U.S. Cl. 12—142 R **14 Claims**



1. A method of preparing a protective device for safety shoes, which device comprises an integral one-piece sole-protecting portion and a toe-protecting portion, the toe-protecting portion characterized by an arch with open front and rear ends therein, which protective device is adapted to be inserted and used in safety footwear, which method comprises:

a. providing a unitary piece of a flat sheet material, the material composed of a unitary sole-protecting portion having a general shape of at least a portion of a foot, and at least one extending element, which extending element has at least one foot-contoured outer edge thereon and adapted to be formed into a toe-protecting portion;

b. forming the extending element over the sole-protecting portion along a line which is of a foot-contoured shape with the sole-protecting portion so as to form a toe-protecting portion over the sole-protecting portion characterized by open front and rear ends; and

c. securing the free outer foot-contoured edge of the extending element forming the toe-protecting portion to the opposing foot-contoured line or edge of the sole-protecting portion, thereby forming a protective device.

3,903,558

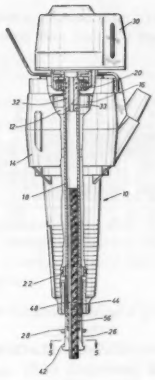
ERASER STRIP AND CHUCK ASSEMBLY FOR MOTOR DRIVEN ERASING MACHINES

Clifford E. Anderson, 6440 Hillcroft, Houston, Tex. 77036

Filed Nov. 6, 1972, Ser. No. 304,354. The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.

Int. Cl.[2] A47L *5/24;* **B43L** *19/00*

U.S. Cl. 15—3.53 **10 Claims**



1. An eraser strip and chuck assembly for motor powered erasing machines having means for conducting a flow of pressurized gas to a surface being erased for cooling and cleaning purposes, said eraser strip and chuck assembly comprising:

a source of pressurized gas;

a chuck tube being connected in driven relation to the motor of the erasing machine, said chuck tube receiving said pressurized gas;

a collet mechanism being disposed at the lower extremity of said chuck tube; and

a strip of erasing material being removably disposed within said chuck tube and collet mechanism said eraser strip having at least one elongated groove defined therein and extending along the length thereof, said groove cooperating with said chuck tube and said collet mechanism to define gas passage means between the exterior surface of said strip of erasing material and said chuck tube and collet mechanism, said gas passage means terminating at an outlet opening near the tip of said strip of erasing material and directing the flow of gas from said gas passage means against the surface being erased, said collet mechanism establishing releasable gripping relation with said strip of erasing material and confining the flow of said pressurized gas to said gas passage means.

2. An eraser strip and chuck assembly as recited in claim **1:** said groove being of arcuate cross-sectional configuration.

3,903,559

DEVICE FOR CLEANING VEHICLE WHEELS

Walter Kuster, and Marcel Chamot, both of Geneva, Switzerland, assignors to TVI-Television Industrielle S.A., Switzerland

Filed July 8, 1974, Ser. No. 486,325

Claims priority, application Switzerland, July 10, 1973, 10004/73

Int. Cl. B60s *3/00*

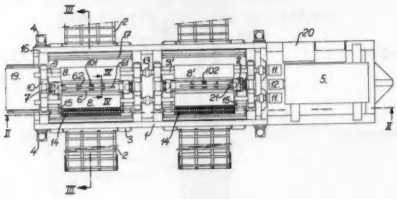
U.S. Cl. 15—21 R **17 Claims**

1. A device for cleaning the wheels of vehicles, comprising a frame, a platform, two pairs of rollers which may be rotated by at least one motor and are disposed in a manner to turn a

set of coaxial wheels of a vehicle to be cleaned, one of the two parts namely the platform or roller bearings being movable heightwise by the intermediary of hydraulic cylinders between a first position in which said wheels are supported by the platform and a second position in which said wheels are supported by the rollers, and means for cleaning said wheels, characterized in that it further comprises:

a. at least one contact on the platform for actuation by the vehicle in its correct position, and connected in a first circuit controlling a first control member which triggers movement of the said mobile part towards its second position;

b. at least one end-of-path contact actuated by said mobile part in its second position and connected in a second



circuit controlling a second control member for starting up the rollers;

c. a counter of the rotation speed of the rollers adapted to emit signals; and

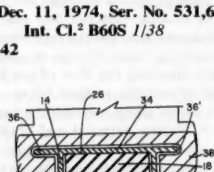
d. an electronic circuit controlled by said second circuit and by the signals of said counter and including: a third circuit energizing an alarm with a delay ($\Delta t4$) defined by a delay element (T4) if after actuation of said second control member the rollers do not reach a given rotational speed; a fourth circuit controlling a third control member for staring up said cleaning means; a fifth circuit for providing after a given period a stop signal which stops the rollers and said cleaning means; and a sixth circuit controlling a fourth control member to actuate the movement of said mobile part towards its first position.

3,903,560

WINDSHIELD WIPER REFILL

David E. Jewell, Littleton, and Paul D. Schlegel, Boulder, both of Colo., assignors to The Gates Rubber Company, Denver, Colo.

Filed Dec. 11, 1974, Ser. No. 531,658
Int. Cl.² B60S *1/38*
U.S. Cl. 15—250.42 **11 Claims**



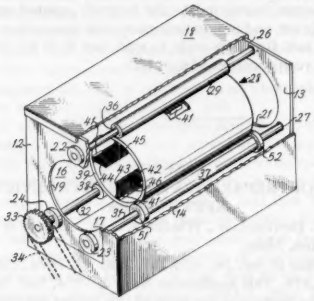
9. In an elongated backing member for retention of a wiping element in a windshield wiping device, said backing member comprising a housing for receipt of a retention portion of the wiping element, and means for engaging claws of a superstructure for transmitting pressure to the wiping element through the backing member, the improvement comprising integral protrusions disposed sidewardly and downwardly from said housing and located substantially at an end extremity of said housing, said housing being free of said protrusions inwardly of the end extremity adapted and arranged so that the end(s) of the wiping element when engaged in the housing will be restricted in flex-over angle by the protrusions at the end extremities of the backing member.

3,903,561

CLEANSING APPARATUS

Edward Alan McCaslin, Marion, Ind., assignor to The Anaconda Company, New York, N.Y.

Filed Aug. 19, 1974, Ser. No. 498,822
Int. Cl.² A46B *13/04*; B08B *9/02*
U.S. Cl. 15—88 **3 Claims**



1. An apparatus for cleansing a continuously advancing elongated member comprising:

A. a chamber comprising front and rear walls defining front and rear openings for the passage through said chamber of said member,

B. at least one spray-head within said chamber for applying cleansing liquid to said member,

C. sump means collecting said liquid from within said chamber and means pumping said liquid from said sump means to said spray-head,

D. an open ended brushing cylinder mounted within said chamber for the passage therethrough of said member, said cylinder comprising inwardly extending radial bristles, said bristles being sufficiently long to brush the surface of said member during passage through said cylinder,

E. at least two horizontal rollers, rotatably supporting said cylinder, and

F. means rotatingly driving at least one roller, said cylinder being rotated by frictional engagement with said driven roller.

3,903,562

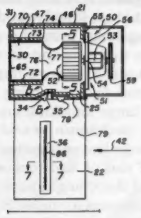
CAR DRYING APPARATUS

Garry N. Miles, 1386 Lawson Ave., West Vancouver, British Columbia, Canada

Filed Apr. 16, 1973, Ser. No. 351,331
Int. Cl.² B60S *3/04*
U.S. Cl. 15—301 **3 Claims**

1. Car drying apparatus comprising a casing having enclosing walls defining a generally unobstructed plenum chamber, a plurality of air nozzles spaced apart on some of the enclosing walls, one of the enclosing walls having an air inlet, air moving means including an open-periphery impeller mounted within the plenum chamber, said impeller being spaced from the walls of said plenum chamber and being open about its periphery for discharge of air around the full circumference of the impeller so as to develop a relatively high plenum static pressure with relatively low impeller discharge velocities, said impeller being the only air-moving and air pressure-building component of the air moving means enclosed within the plenum chamber and being rotatable to maintain a predeter-

mined static pressure therein whereby air is discharged from the air nozzles at a relatively high velocity with respect to the



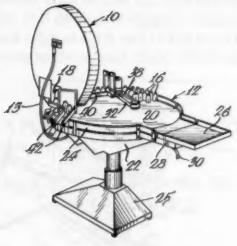
power consumed by the air moving means and with respect to air velocities within the plenum chamber.

3,903,563

METHOD AND APPARATUS FOR SORTING AND CLEANING BOTTLES

Thomas J. Casey, Arlington Heights, and George F. Loeffler, Barrington Hills, both of Ill., assignors to Thomas Machinery Corporation, Hoffman Estates, Ill.

Filed June 21, 1972, Ser. No. 264,856
Int. Cl.² B08B *9/08*
U.S. Cl. 15—304 **2 Claims**



1. Apparatus for cleaning containers in an efficient manner comprising conveyor means for horizontally conveying containers in a file, and cleaning means comprising vertical rotary wheel means for picking containers up from said conveyor means, inverting said containers, and redepositing said containers on said conveyor means, said rotary wheel means including an inlet and an outlet located on opposite sides of said wheel means, said wheel means being disposed on an acute angle with respect to said file of containers, said conveyor comprising turntable means rotating in a direction toward said inlet and serving to bring a single file of containers into said inlet and away from said outlet.

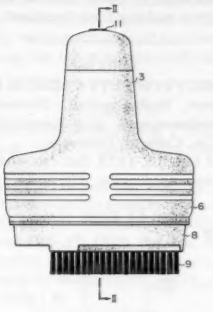
3,903,564

TABLE TOP CLEANER

Kikuo Morinaga, Tokyo, Japan, assignor to Jujo Central Co., Ltd., Japan

Filed Oct. 31, 1973, Ser. No. 411,276
Int. Cl.² A47L *5/24*
U.S. Cl. 15—344 **1 Claim**

1. A table top cleaner comprising a casing in which an electric motor and dry cells for operating same are placed, a fan chamber disposed intermediate the upper and lower ends of said casing and formed with openings in the peripheral walls of said casing and extending around substantially the entire periphery, said fan chamber having mounted therein a suction fan facing downwardly and connected to a shaft of said electric motor, a dust collecting chamber for collecting therein particles of dust drawn by said suction fan and introduced into the fan chamber through a dust drawing passageway extending through said dust collecting chamber, and a filter means comprising a filter disposed around the periphery of said fan chamber and juxtaposed to said openings in said peripheral walls,



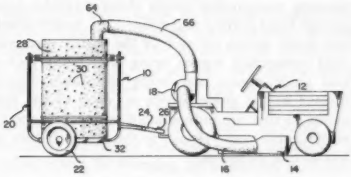
said openings being disposed outwardly of said filter, said dust collecting chamber being disposed at the lower end of the casing, and bristles arranged around the intake orifice of said dust drawing passageway.

3,903,565

LEAF AND GRASS CART BAGGER

Littleberry T. Hicks, 1524 Deerwood Dr., Lynchburg, Va. 24502

Filed Dec. 5, 1973, Ser. No. 422,042
Int. Cl.² A47L *9/10*
U.S. Cl. 15—352 **5 Claims**



1. A leaf and grass cart bagger comprising:

A. a wheeled cart adapted for attachment to a vehicle having a material pick-up and blower;

B. a barrel mounted on said cart, wherein said barrel further has a plurality of perforations through the side thereof adapted for exhausting air from the blower as material is discharged into said barrel from the blower, and;

C. conduit means for interconnecting the discharge of said material pick-up and blower on a vehicle with the interior of said barrel for discharge of picked up material therein, wherein said barrel has an open upper end and, in an upright filling position, with a lid removably attached to and over said open upper end with said conduit means further having an end thereof attached to, and opening through, said lid, said lid when so attached serving both to close said open upper end of said container and to force said air from said blower to exhaust only through said barrel perforations whereby said discharged material is packed within said barrel, and;

D. pivoted barrel emptying means interengaging said container and said cart to permit tilting of said barrel on said cart from said upright filling position to a tilted material emptying position, said pivoted emptying means comprising a barrel strap partially encircling and secured to said barrel, proximate the open upper end thereof, and pivotally secured around a bar connected to said cart for pivotally mounting said barrel about said bar, said pivoted

emptying means further including, in said tilted material emptying position, said open upper end of said barrel with a material collection bag engaged thereover, and means resiliently attaching said bag to said barrel, whereby by removing said lid, attaching said bag and pivoting said barrel to said tilted position, material from said barrel is discharged into said bag for subsequent disposal thereof.

3,903,566

HINGE ASSEMBLY FOR BUTT-CLOSING DOOR LEAVES

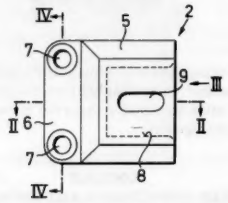
Hellmuth Grünert, Hoffnungsthal, Germany, assignor to Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co., Cologne, Germany

Filed Oct. 10, 1973, Ser. No. 405,227

Claims priority, application Germany, Oct. 14, 1972, 2250525

Int. Cl. E05d *11/00*

U.S. Cl. 16—137 **11 Claims**



1. A hinge assembly for butt-closing door leaves comprising:

a. a frame fixture element, a door leaf fixture element and an independent connecting mechanism,

b. each said fixture element including a guide means,

c. said connecting mechanism including a fixed portion, a pivoting portion that pivots about a pivotal axis located on said fixed portion and connecting means which engage said guide means on each of the fixture elements,

d. said connecting means being detachably lockable with said guide means and being adjustably disposed with respect to the guide means on each of the fixture elements so that the independent connecting mechanism is displaceable with respect to the frame fixture and door leaf fixture elements.

3,903,567

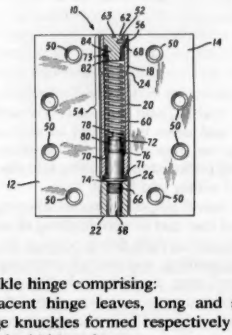
TWO KNUCKLE HINGES

Charles R. Suska, Roxbury, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Sept. 24, 1974, Ser. No. 508,824

Int. Cl.² E05F *1/12*

U.S. Cl. 16—189 **10 Claims**



1. A two knuckle hinge comprising:

a pair of adjacent hinge leaves, long and short axially aligned hinge knuckles formed respectively on the adjacent edges of said hinge leaves;

an anti-friction bushing in the end of said long hinge knuckle adjacent said short hinge knuckle for providing thrust and lateral bearing surfaces for the hinge;

a pintle, about which said long hinge knuckle pivots, supported in said short hinge knuckle and extending through said busing in said long hinge knuckle, a flange on said pintle positioned between said long and short hinge knuckles and in contact with said bushing for providing an anti-friction surface for said bushing and for preventing said pintle from being driven out of said hinge knuckles; and

a torsion spring mechanism in said long hinge knuckle for urging said hinge leaves together, means for non-rotatably fixing one end of said torsion spring mechanism remote from said short hinge knuckle in the end of said long hinge knuckle, means for fastening said pintle to the other end of said torsion spring mechanism, and means for non-rotatably supporting said short hinge knuckle.

3,903,568

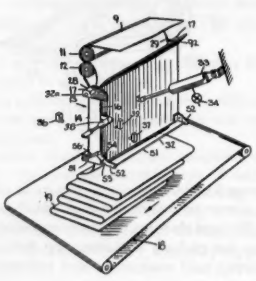
PRODUCTION OF BATTING

George A. Watson, Davidson, N.C., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 116,046, Feb. 17, 1971, Pat. No. 3,747,162, which is a division of Ser. No. 37,416, May 13, 1970, Pat. No. 3,660,867, which is a continuation of Ser. No. 568,877, July 29, 1966, abandoned. This application July 3, 1973, Ser. No. 376,252

Int. Cl.² D04H *11/04*

U.S. Cl. 19—163 **1 Claim**

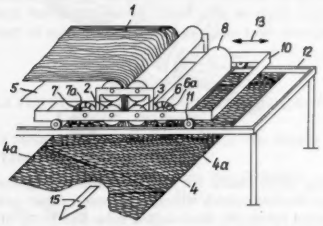


1. Apparatus for the manufacture of cross-lapped structures comprising means for continuously supplying a longitudinally moving wide fine web of substantially parallel filaments at a predetermined linear speed, a support, means for traversing said web by alternately moving the web in opposite direction across said support to deposit the web in folded condition on said support, said traversing means including an oscillating chute for receiving the moving web and discharging said web onto said support, said chute comprising opposed wide panels with inner walls having smooth surfaces separated by a distance substantially greater than the thickness of said web, said panels converging toward an exit, means for oscillating said chute at a predetermined rate to provide a predetermined linear speed of traverse of said exit substantially lower than the linear speed of said web, said exit being spaced from said support sufficiently for said web, in travelling from said exit to said support, to billow outward substantially beyond the limits of the traverse of said exit, and baffle means associated with said chute to regulate and direct the currents of air generated by the oscillation of said chute to control the billowing effect.

3,903,569
SMOOTHENING DEVICE FOR CROSS-LAPPER

Curt Brandis, Westerhof, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Sept. 6, 1973, Ser. No. 394,726
Claims priority, application Germany, Sept. 14, 1972, 2245051
Int. Cl. D04h 11/04
U.S. Cl. 19—163 6 Claims

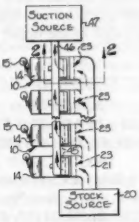


1. A cross-lapping device for cross-lapping a web onto a receiving surface to form folds in said fleece, which includes a reciprocable carriage having a feeding table and calendar rollers between which the web is fed and is crosslapped, whereby said web is folded at each end of movement of said reciprocating carriage to form folded edges, blade wheel means at opposite ends of said carriage between said calendar rollers and the end of said carriage to direct a current of air onto the folded edge at each end of the travel of said carriage, and drive means to drive said blade wheel means.

3,903,570
APPARATUS FOR FORMING A LAP OF TEXTILE FIBER

Daniel G. Rowe, III, 4323 Water Oak Rd., Charlotte, N.C. 28211

Filed Oct. 20, 1972, Ser. No. 299,215
Int. Cl.² D01H 5/32
U.S. Cl. 19—240 2 Claims

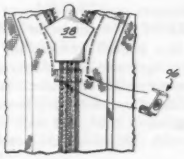


1. Apparatus for forming a lap of textile fibers comprising a chute adapted to receive a mass of loose fibers therein, a rotary condenser drum having a substantially cylindrical foraminate wall, duct means for directing fibers from said chute to said condenser drum and defining with said foraminate wall a fiber density control zone alongside of said condenser drum, spaced rotary feed rolls adjacent the terminal end of said chute for feeding fibers from said chute into said duct means, suction means for effecting a suction air flow through said control zone and into said condenser drum, means adjacent and downstream of said control zone for compacting the fibers against said wall of said condenser drum to form a lap thereof, means for sensing variations in suction pressure as caused by variations in density of the fibers in the control zone relative to a predetermined density, means responsive to said sensing means sensing said variations in suction pressure for compensatively varying the rate of the suction air flow through said control zone and said condenser drum so that said condenser drum will carry a substantially uniform amount of fibers therewith from said control zone to said compacting means to form a lap of substantially uniform density, means for driving said feed rolls, and means operatively connected to said driving means and responsive to said sensing means sensing said variations in suction pressure for compensatively varying the rate of rotation of said feed rolls to aid in forming the lap of substantially uniform density.

3,903,571
SLIDER STOP FOR SEAM TYPE ZIPPERS

Robert B. Howell, 3400 W. Mercer Way, Mercer Island, Wash. 98040

Continuation-in-part of Ser. No. 128,322, March 26, 1971, Pat. No. 3,805,339, which is a continuation of Ser. No. 30,706, April 22, 1970, Pat. No. 3,613,611, which is a division of Ser. No. 768,466, Oct. 17, 1968, Pat. No. 3,555,627. This application Aug. 10, 1973, Ser. No. 387,356
Int. Cl.² A44B 19/36, 19/18, 21/00
U.S. Cl. 24—205.11 R 5 Claims



1. A seam type slide fastener having a seam side and a connector means side, comprising:

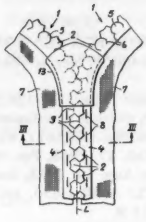
first and second fabric tapes, an elongated connector means secured to each tape, each said connector means being releasably connectible to the elongated connector means on the other tape, means permanently securing connected end portions of said two connector means together near one end of said slide fastener and forming an end stop at such end, and a slider movable along the unsecured portion of said two connector means and including means for bringing the unsecured portions of said two connector means together into connected engagement when moved lengthwise of the slide fastener towards the unsecured end thereof, and for separating such unsecured portions of the connector means when so moved in the opposite direction, said two connector means being located completely on said connector means side of the slide fastener and said two tapes coming together as folds on the seam side of such slide fastener when the connector means are engaged; and

a snap on slider stop channel member comprising a back wall and side wall means together forming a single channel space which is normally slightly smaller in size than the connected together portions of the connector means, said side wall means being resiliently flexible, whereby such side wall means will spring outwardly to allow passage of the connected together portions of the connector means into the channel space when the slider stop channel member is snapped in place thereon, and then frictionally engages the connected together portions of the connector means to hold such member thereon, one of said back wall and said side wall means including at least one inwardly struck barb which engages the connected together portions of the connector means when the slider stop channel member is being snapped onto the connected together portions of the connector means, to in that manner restrain said slider stop against free sliding movement along such connected together portions of the connector means.

3,903,572
SLIDE FASTENER

Yoshiko Takagi, Osaka, Japan, assignor to Opti Holding AG., Glarus, Switzerland

Filed Aug. 6, 1974, Ser. No. 495,239
Claims priority, application Japan, Aug. 10, 1973, 48-90382; Nov. 16, 1973, 48-129587; Mar. 28, 1974, 49-36232
Int. Cl.² A44B *19/14, 17/00*
U.S. Cl. 24—205.13 D 6 Claims

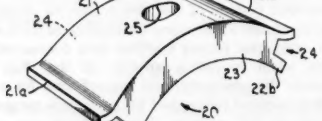


1. A slide-fastener coupling element comprising a pair of like halves made of synthetic resin and each formed with a succession of like laterally projecting coupling heads each having a narrow neck and with a succession of like blocking tongues lying between said heads, said halves being interleavable with the heads of one half lying between the necks and on top of the tongues of the other half, said halves defining a stringer plane with said heads projecting to one side of said plane.

3,903,573
ARCUATE, STAMP DOWN FASTENERS FOR SHEET SECUREMENT

Floyd Leroy Wilson, P.O. Box 203, Manhattan, Kans. 66502

Filed Oct. 17, 1973, Ser. No. 407,064
Int. Cl.² A44B *21/00*
U.S. Cl. 24—73 D 14 Claims



1. A snap-in fastener adapted to removably engage at least two opposed edges of aligned rectangular openings through at least two perforated work member sheets comprising:

a rectangular body member integrally formed of normally shape-retaining yet resiliently deformable material,

a pair of spaced-apart, substantially equal length flanges on each of two opposed edges of said member forming therebetween a pair of parallel, spaced-apart grooves,

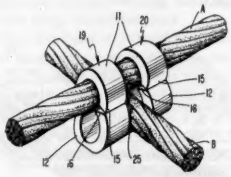
the body member originally arcuate in transverse section taken at right angles to said flanges and grooves before application to the work members to be secured with respect to one another,

whereby, when the body member flanges are initially engaged on edges of aligned openings through said work members and the center thereof is flattened, the fastener will fully engage the edges of the work member aligned openings and secure the said work members with respect to one another, with the formerly arcuate body section in line with the engaged work members.

3,903,574
CABLE CLAMP

Donato M. Fraioli, Mamaroneck, N.Y., assignor to Air-Tech Industries, Inc., Clifton, N.J.

Filed June 19, 1974, Ser. No. 480,831
Int. Cl.² A44B *21/00;* B25G *3/36*
U.S. Cl. 24—243 CR 10 Claims

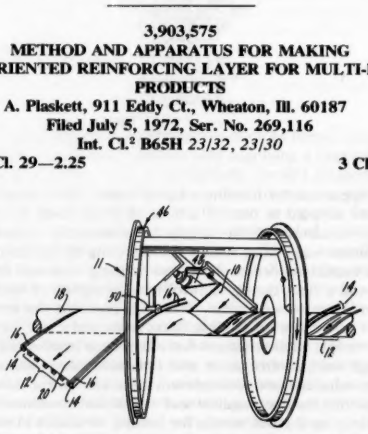


1. A one piece clamp for rigidly clamping together upper and lower flexible cables which cross each other comprising an elongated relatively thickwalled tube-like body of malleable metal having in side view a generally U-shaped configuration defined by a base section and upright sections, said upright sections being spaced apart to receive the lower cable therebetween, said body having in its open condition a shape in end view defined by an upper hooked portion having a free edge, a lower hooked portion having a free edge, and a portion joining said upper and lower portions on the sides thereof opposite to said free edges, said free edges being spaced from each other, said base section comprising the lowest part of said lower portion and having a vertical dimension greater than the wall thickness of said lower portion to provide two spaced surfaces for contacting the lower cable on each side of the vertical centerline of the clamp, the vertical dimension of the clamp in its open condition being only slightly greater than the sum of the diameters of the cables and the wall thickness of said upper and lower portions, said free edges being spaced sufficiently to allow the upper cable to enter the clamp with the lower cable in place, said clamp being dimensioned with respect to the cable diameters so that upon deforming the clamp by squeezing the upper and lower portions toward each other, the cables are forced together whereby the upper cable tends to bend downwardly on each side of the lower cable by contact with said upper portions and the lower cable tends to bend upwardly on each side of the upper cable by contact with said spaced surfaces.

3,903,575
METHOD AND APPARATUS FOR MAKING REORIENTED REINFORCING LAYER FOR MULTI-PLY PRODUCTS

Clyde A. Plaskett, 911 Eddy Ct., Wheaton, Ill. 60187

Filed July 5, 1972, Ser. No. 269,116
Int. Cl.² B65H *23/32, 23/30*
U.S. Cl. 29—2.25 3 Claims



1. A method for changing the orientation of a layer of material having its longitudinal axis parallel to its direction of

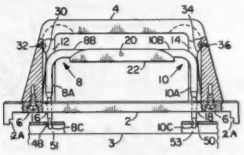
travel comprising driving a plurality of spaced narrow endless carrier belts longitudinally in a helical path about a stationary mandrel, wrapping said layer about and upon said mandrel and belts so that the longitudinal axis of said layer is at right angles to the longitudinal axis of said belts, gripping said layer with a pair of endless gripping cables cooperating with a pair of said belts at what will become the edges of a reoriented layer and continuously cutting said layer between said pair of belts at approximately the location of initial gripping to form a reoriented layer consisting of a succession of pieces of said layer each having its longitudinal axis at right angles to the movement of said reoriented layer from said mandrel.

3,903,576

APPARATUS FOR EXTRACTING CIRCUIT CARDS FROM CHASSIS

Seymour Stein, Monsey, N.Y., assignor to The Bendix Corporation, Teterboro, N.J.

Filed Oct. 1, 1974, Ser. No. 510,934
Int. Cl. H01r
U.S. Cl. 29—203 H **7 Claims**



1. A device for disengaging and removing a circuit board from a chassis, the circuit board being supported in the chassis and engaged with mating connectors therein, the device comprising:

clamping means including a pair of clamps supported in variable spaced relation to each other and relative to receiving holes carried by a pair of brackets supported by the circuit board;

each of the clamps including an end received by the hole in the corresponding circuit board bracket;

a pair of resilient members, each of which is supported adjacent a corresponding one of said clamps, for exerting a force on the clamps to fix the space therebetween when the clamping means is actuated away from the circuit board against the resilient members;

the clamp ends being arranged to grasp the area around the underside of the receiving holes upon the space between the clamps being fixed;

means arranged with the clamping means and resilient means for enabling an operator to exert a force for first disengaging the circuit board from the chassis connectors and then removing the board from the chassis; and

the clamp ends being released from the underside of the receiving holes upon actuation of the clamping means toward the circuit board after the board has been removed from the chassis to release the force exerted on the clamps by the resilient members and to release the board.

3,903,577

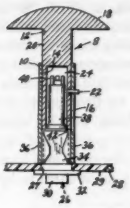
TOOL FOR REMOVING PUSH BUTTONS

Ruben Verldon Phillips, Mason, Ohio, assignor to Cincinnati Milacron, Inc., Cincinnati, Ohio

Filed June 12, 1974, Ser. No. 478,711
Int. Cl.² B25B *27/14*
U.S. Cl. 29—203 H **5 Claims**

1. An apparatus for removing from a panel a spring-retained push button having a retainer spring and a push button body with extensions thereon, said apparatus comprising:

a. means for releasing the retainer spring to permit removal of said push button from the panel; and



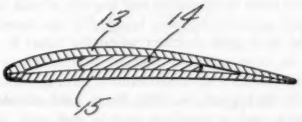
b. a plunger in sliding engagement with said releasing means for removing the released spring-retained push button from the panel, said plunger having means for enclosing the push button body extensions to protect them during removal.

3,903,578

COMPOSITE FAN BLADE AND METHOD OF CONSTRUCTION

Edward A. Rothman, South Glastonbury, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Division of Ser. No. 229,873, Feb. 28, 1972, Pat. No. 3,799,701. This application Dec. 13, 1973, Ser. No. 424,398
Int. Cl.² B21K *3/04*
U.S. Cl. 29—156.8 H **1 Claim**



1. The method of fabricating a fan blade for a propulsor driven by a turbine type power plant which blade has a relatively large solidity factor comprising the steps of preforming from tapes of relatively high modulus filamentary reinforced composite material by laying presized tapes in a predetermined manner and compressing under controlled pressure and temperature to form separately the camber side and face side, preforming of predetermined size a spar from metallic material, aligning the camber side and face side relative to each other so that their edges overlie and are coextensive and each side is positioned relative to said spar to define a hollow portion adjacent the tip of the spar and tip formed by the junction made between the top edges of the camber and face sides, joining by diffusion bonding, the face side, camber side and spar to each other such that said camber side and space side are joined at their edges and the spar extends centrally between the camber side and space side and projecting therebeyond to define the root section of the fan blade.

3,903,579

ARTICLE WITH MOVABLE APPENDAGES

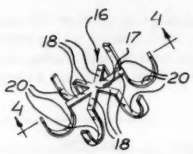
Ronald S. O. Zane, 2572 Hammer Ave., Norco, Calif. 91760, and Lester W. Mendell, Jr., 1432 Mariposa, Corona, Calif. 91720

Division of Ser. No. 888,796, Dec. 29, 1969, Pat. No. 3,697,362. This application Aug. 17, 1972, Ser. No. 281,504
Int. Cl.² B22F *5/00*
U.S. Cl. 29—183 **3 Claims**

1. A six-legged member formed from thin sheet metal and having a core segment and six legs of dead-soft character which extend equiangularly outwardly therefrom, said six-legged member being adapted for use in conjunction with a

mold that is suitable for the preparation of a novel decorative item comprising, in combination, main body means, appendant means and elongate, dead-soft means interconnecting the appendant means and main body means to provide flexible stemlike means through which the appendant means can be tiltably adjusted relative to the main body means, said mold being characterized by the presence of spaced apart depressions in which hardenable material can be cast to form said main body means and said appendant means, said depressions being unconnected by flow paths permitting movement of a flowable material from one to another when said mold is disposed in its normal position of use;

said legs being so disposed and formed with U-shaped outer segments as to permit them to bridge the respective gaps



between at least some of the depressions for said appendant means and the depression for said main body means in said mold when said six-legged member is positioned with its core segment in the latter depression and its legs extending toward said depressions for said appendant means;

whereby the casting of a suitable material in said depression for said main body means and in each of said depressions for said appendant means bridged to the former by a leg of said six-legged member when the latter is positioned with its core segment therein in the above-described manner, yields a novel decorative item in which said legs of said six-legged member form said stemlike means between said appendant means and said main body means.

3,903,580

APPARATUS FOR ASSEMBLING A U-SHAPED FASTENER ON SHEET MATERIAL

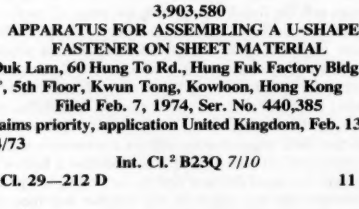
Ka Duk Lam, 60 Hung To Rd., Hung Fuk Factory Bldg., Block 'B', 5th Floor, Kwun Tong, Kowloon, Hong Kong

Filed Feb. 7, 1974, Ser. No. 440,385

Claims priority, application United Kingdom, Feb. 13, 1973, 7094/73

Int. Cl.[2] B23Q *7/10*

U.S. Cl. 29—212 D **11 Claims**



1. Apparatus for fastening sheet material by means of a generally U-shaped fastener comprising

a. elongate magazine means (**5**) including a pair of relatively movable magazine members (**3, 18**) for receiving a plurality of said fasteners, said magazine means being open along one longitudinal side, the adjacent opposed longitudinal surfaces of said magazine members containing recesses for receiving the arms of said fasteners when said fasteners are arranged within said magazine means with the U openings of the fasteners facing said one longitudinal side;

b. means (**10, 15**) for biasing the fasteners in said magazine means toward a fastening station at one end of said magazine means; and

c. fastening means including a fastening member (**24**) operable to bear on an arm of a fastener in said fastening station to deform said arm into engagement with sheet material received between the arms of the fastener in said station, whereby the sheet material received between the arms of the fastener in said fastening station can extend also between the arms of the remaining fasteners in said magazine means.

3,903,581

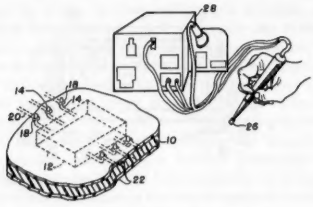
METHOD OF REPAIRING SOLDERED CONNECTIONS

Billy J. Michel, 1803 Encino Dr., Escondido, Calif. 92025

Filed June 3, 1974, Ser. No. 475,354

Int. Cl.[2] B23P *7/00;* **H05K** *3/28*

U.S. Cl. 29—401 **8 Claims**



1. A method of repairing a soldered wire connection having a protective conformal coating thereover having a melting temperature higher than the melting temperature of the solder, the method comprising the steps of:

forming inlet and outlet openings through said coating directly into the soldered area;

heating the solder to melting temperature;

removing the molten solder by suction at the outlet opening with the molten solder being replaced by air admitting through the inlet opening; and

removing the unsoldered wire.

3,903,582

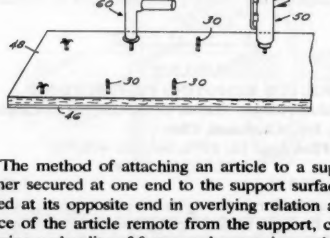
MULTIPLE SEGMENT FASTENER AND METHOD

Theodore J. Sweeney, Grosse Pointe, and Donald H. Ettinger, Royal Oak, both of Mich., assignors to USM Corporation, Boston, Mass.

Filed June 7, 1973, Ser. No. 367,719

Int. Cl. B23p *17/00*

U.S. Cl. 29—411 **8 Claims**



1. The method of attaching an article to a support by a fastener secured at one end to the support surface and deformed at its opposite end in overlying relation against the surface of the article remote from the support, comprising: arranging a plurality of fastener elements in contiguous rela-

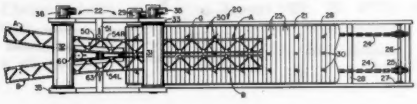
tion of a length substantially greater than the fastener; while holding said fastener elements in the aforesaid relation, positioning them adjacent the support generally perpendicular to the support surface; end welding the fastener elements to the support surface; cutting the fastener elements at a point spaced from the support surface to form a multiple segment fastener; and deforming the upstanding free ends of the element segments into overlying relation with an article previously assembled on the support to secure the article to the support.

3,903,583

CAMBERING ATTACHMENT FOR TRUSS ASSEMBLY JIG

James D. Adams, P.O. Box 7462, Colorado Springs, Colo. 80933

Filed Jan. 31, 1975, Ser. No. 546,025
Int. Cl.[2] B23P *11/00*
U.S. Cl. 29—432 **8 Claims**



1. In a truss assembly jig for forming a timber joist truss having parallel upper and lower chords and diagonal struts between the chords, with the truss members, the chords and the struts being fastened together by spiked gusset plates, the combination including:

a. a movable support surface whereon the truss members are placed in preassembled longitudinal position to be thereafter moved to and from a discharge end of the support surface with the longitudinal upper and lower chords being essentially straight and parallel;

b. a first pair of spaced apart roll means near the discharge end of the support surface including a roll spaced above the surface a distance sufficient to partially impale the gusset plates into the wooden truss members as the truss moves thereunder towards the discharge end of the surface;

c. a second pair of spaced apart roll means a short distance beyond the discharge end of the support surface to receive the truss as it moves from the support surface, said second roll means having rolls spaced to press the gusset plates into and against the sides of the truss members to finish the truss; and,

the improvement, comprising deflector means between the first and second pair of roll means bearing against the upper chord of a truss passing from the support surface and to the said second pair of roll means whereby to longitudinally deflect the truss and impart a camber to the truss as it passes through the second roll means.

8. The method of forming a wooden joist truss, including longitudinal upper and lower wooden chords with wooden crossbracing members, with a predetermined camber, the steps of:

a. assembling truss components on a movable surface with the upper and lower chords held by clamps along straight lines and parallel to each other;

b. placing toothed gusset plates in opposed relation on each side of each joint in the joist truss;

c. moving the assembled components through a first set of roller presses to initially partially embed the teeth of the gusset plates in the wooden members sufficiently to hold the members in position free of the clamps;

d. deflecting the truss as it exits from the first set of rollers so as to arc the upper and lower chords at a predetermined camber; and

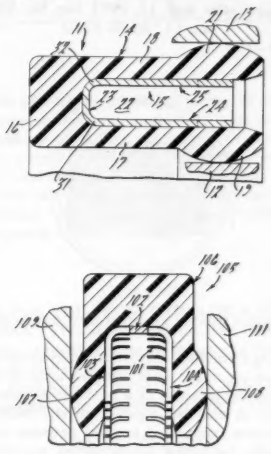
e. passing the arced joist truss through a second set of rollers to press the gusset plates fully into the wooden members, to form a rigid joist truss with a predetermined, accurate camber.

3,903,584

METHOD OF MANUFACTURE OF SPRING FOR COMPOSITE SEALING RING

Bruce B. Evans, Jackson, Mich., and Edwin C. Elsner, Kanosh, Utah, assignors to Aeroquip Corporation, Jackson, Mich.

Division of Ser. No. 251,366, May 8, 1972, Pat. No. 3,837,631.
This application Feb. 13, 1974, Ser. No. 442,065
Int. Cl.[2] B23P *11/02*
U.S. Cl. 29—450 **3 Claims**



1. In a method for fabricating a spring for a composite sealing ring, the steps of forming a flat blank of spring-like material by photoetching, said blank having a web and a pair of flanges in the form of outwardly extending fingers, bending said blank along two parallel lines whereby the blank is formed into a U-shaped member having an elongated central web and two opposite flanges, and inserting said spring into the jacket of a composite sealing ring whereby the web of said spring engages the web of said jacket and the flanges of said spring engage and press outwardly on the jacket flanges.

3,903,585

METHOD OF BRAZING

Valentin Petrovich Kosteruk, ulitsa M. Krivonosa, 19, kv. 5, and Mikhail Savvich Kovalchenko, ulitsa Kapitanovskaya, 10, kv. 20, both of Kiev, U.S.S.R.

Continuation of Ser. No. 875,503, Nov. 10, 1969, abandoned.
This application Apr. 27, 1972, Ser. No. 248,295
Int. Cl. B23k *31/02*
U.S. Cl. 228—121 **5 Claims**

1. A method of brazing carbides, borides, nitrides, silicides and ceramics to each other and to high melting metals comprising brazing said materials in the presence of a brazing composition consisting essentially of an alloy consisting essentially of a major proportion by weight of hafnium, a first additive component selected from the group consisting of copper, gold, silver and mixtures thereof, in an amount of from 2 to 30 percent of the alloy weight, and a second additive component selected from the group consisting of boron, aluminum, scandium, yttrium, lanthanides, carbon, silicon, germanium, titanium, zirconium, vanadium, niobium, tantalum, phosphorous, chromium molybdenum, tungsten, manganese, technetium, rhenium, ruthenium, osmium, cobalt, nickel, rhodium, palladium, iridium, and platinum, in an amount of 2 to 21 percent

of the alloy weight wherein said alloy is applied as particles to the surface of the materials to be brazed, said particles having a particle size of at least about 1mm diameter, and heated to a melting temperature under a vacuum of at least 10^{-2}mm Hg in an inert or reducing atmosphere.

3,903,586

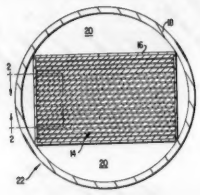
METHOD OF MAKING LAMINATED MAGNETIC MATERIAL

Clay N. Whetstone, Denver, Colo., assignor to Pacific Magnetic Structures, Inc., San Diego, Calif.

Division of Ser. No. 79,864, Oct. 12, 1970, Pat. No. 3,756,788. This application Apr. 12, 1973, Ser. No. 350,595

Int. Cl.[2] B23K *31/02*

U.S. Cl. 228—190 **32 Claims**



1. A method of making a laminated material comprising the steps of:

constructing a laminate comprised of layers of magnetically soft metal separated by at least one layer of an insulating compounding material of a type which, when annealed, will form at least one layer of an electrically insulating intermetallic compound located between said layer of electrically insulating compounding material and said layer of magnetically soft metal; and,

subjecting said laminate to heat and pressure so that said layers of magnetically soft metal and said layer of insulating compounding material are diffusion bonded.

3,903,587

METHOD OF INSTALLING A DIVIDER STRIP IN A TERRAZZO FLOOR

Mario J. Boiardi, Cleveland Heights, Ohio, assignor to Boiardi Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 380,964, July 20, 1973. This application Aug. 26, 1974, Ser. No. 500,628

Int. Cl.[2] B23P *17/00*

U.S. Cl. 29—418 **7 Claims**

1. A method of providing a seam in a terrazzo type flooring structure, said method comprising the steps of:

providing at least one elongated generally U-shaped divider member having a pair of spaced apart side walls and a top wall, said side walls and top wall defining an elongated channel;

substantially filling said channel with a resilient filler material;

positioning said U-shaped divider member in an inverted condition so as to extend along the area where said seam is to be formed;

placing a terrazzo type flooring material along both sides of said divider to a level substantially equal to the height of said top wall; and,

selectively removing said top wall from its connection with said side walls by grinding, thereby exposing said resilient material and said resilient preventing foreign matter from entering the area between the side walls during the grinding procedure.

3,903,588

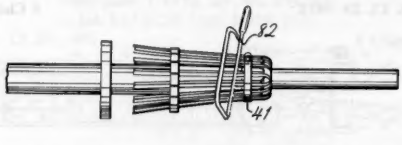
METHOD OF SECURING CABLE TO A BULKHEAD

Leon L. Alleva, and Ralph G. D'Ascoli, both of Yonkers, N.Y., assignors to The Anaconda Company, New York, N.Y.

Division of Ser. No. 354,063, April 24, 1973, Pat. No. 3,855,414. This application June 5, 1974, Ser. No. 476,486

Int. Cl.[2] B23P *25/00*

U.S. Cl. 29—461 **2 Claims**



1. The method of securing flat armor wires of a cable to a bulkhead comprising the steps of:

A. inserting a cut end of said cable through an aperture in a first heavy metal plate,

B. securing a slit cylindrical wire holding tool around said cable between said plate and said end, said tool comprising a flange having a plurality of apertures and a like plurality of radial slots opening from said apertures, the end of said tool remote from said flange facing said cut end,

C. fitting a heavy metal ring around said cable against said tool,

D. bending each of said armor wires around said ring, over said tool and through one of said slots into one of said apertures and twisting said wires thereby retaining them in said apertures,

E. binding and securing the bent wires down upon said ring with a clamping means,

F. severing the bent wires in a circumferential line around said ring and on the side of said clamping means adjacent said tool apertures,

G. removing said tool from said cable and advancing said first plate against said ring,

H. inserting said cable through an aperture in a second heavy metal plate,

I. urging together said first and said second plates thereby compressing said plates against said ring and said wires, and

J. securing said second plate to said bulkhead.

3,903,589

METHOD FOR FABRICATION OF ANODES

Gerhart P. Klein, Manchester, and William F. Vierou, West Acton, both of Mass., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

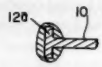
Division of Ser. No. 222,015, Jan. 31, 1972, Pat. No. 3,817,782. This application Feb. 13, 1974, Ser. No. 442,174

Int. Cl. B01j *17/00*

U.S. Cl. 29—570 **1 Claim**

1. A method of making a capacitor comprising the steps of immersing an end of an elongated wire of film-forming metal in a slurry consisting essentially of a liquid and film-forming metal powder particles suspended in the liquid, withdrawing the end of the elongated wire of film-forming metal from the slurry at a rate to deposit a droplet of liquid and film-forming metal powder over the end of the elongated wire immersed in the slurry, sintering deposited film-forming metal powder to

the end of the elongated wire to form a porous deposit of film-forming metal over the end of the elongated wire, forming a dielectric oxide film over the deposited film-forming



metal powder, contacting the dielectric oxide film with an electrolyte, and contacting the electrolyte with means to provide a capacitor.

3,903,590
MULTIPLE CHIP INTEGRATED CIRCUITS AND METHOD OF MANUFACTURING THE SAME

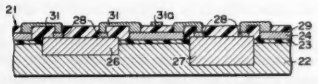
Syunzi Yokogawa, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Mar. 7, 1974, Ser. No. 449,085

Claims priority, application Japan, Mar. 10, 1973, 48-30099

Int. Cl.² B01J *17/00;* **H01L** *1/16, 1/24, 7/68*

U.S. Cl. 29—577 **3 Claims**



1. A method of manufacturing an integrated circuit comprising the steps of forming a first insulating layer on the surface of a metal substrate, the insulating layer having windows to expose the surface portions of the substrate, mounting a first conductive layer on the first insulating layer in a predetermined pattern, mounting a plurality of semiconductor chips having at least one contact electrode provided on the top side thereof on the exposed portions of the substrate through the windows in the first insulating layer, downwardly pressing the semiconductor chips to partially embed the chips in the metal substrate, overlying the semiconductor chips and first conductive layer with a second insulating layer of thermoplastic resin having windows at portions corresponding to the contact electrodes of the semiconductor chips and to predetermined portions of the first conductive layer, and mounting a second conductive layer on the second insulating layer in a predetermined pattern for electrically connecting the contact electrodes of the semiconductor chips to the predetermined portions of the first conductive layer through the windows in the second insulating layer.

3,903,591
SEMICONDUCTOR ARRANGEMENT

Wolfgang Wenzig, and Werner Spaeth, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

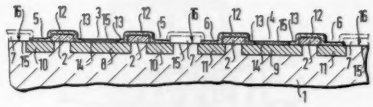
Division of Ser. No. 287,709, Sept. 11, 1972, abandoned. This application Oct. 5, 1973, Ser. No. 403,916

Claims priority, application Germany, Sept. 22, 1971, 2147338

Int. Cl. B01j *17/00*

U.S. Cl. 29—578 **3 Claims**

1. A process for the production of a plurality of identical semiconductor components in a single semiconductor wafer, comprising the steps of: applying a layer of SiO_2 on a surface of the wafer, the layer of SiO_2 becoming a sub-layer of an insulating protective layer for each individual semiconductor component; forming a plurality of contact windows in the SiO_2 layer and a frame-shaped auxiliary window surrounding each contact window; diffusing p-n junctions into the semiconductor wafer through the contact windows, the windows in the diffusion mask being dimensioned and spaced such that none of the p-n junctions opens into the parts of the semiconductor surface which are exposed in the auxiliary windows; covering the SiO_2 sub-layer including the side edges which form said contact and auxiliary windows with a continuous outer sub-layer of an insulating protective layer consisting of an insulating material selected from the group consisting of Si_3N_4, BeO,



and an oxide of a trivalent metal of Group III of the periodic system; removing the outer protective layer in areas of the contact windows to expose the surface of the wafer while maintaining complete coverage of the SiO_2 sub-layer; and forming a metal contact to the exposed wafer portion plus separating the individual components from each other along lines of division which extend exclusively within the areas between adjacent auxiliary windows.

3,903,592
PROCESS FOR THE PRODUCTION OF A THIN LAYER MESA TYPE SEMICONDUCTOR DEVICE

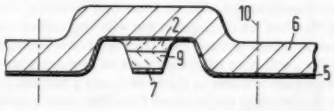
Herwig Heckl, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Germany

Filed May 13, 1974, Ser. No. 469,114

Claims priority, application Germany, May 16, 1973, 2324780

Int. Cl.² B01J *17/00*

U.S. Cl. 29—578 **14 Claims**



1. A process for the production of a semiconductor component in which a disc-shaped semiconductor crystal is covered on its top surface with a uniform epitaxial layer, the epitaxial layer being then partially removed, forming at least one mesa-like projection, the mesa-like projection being provided on its top with a metal electrode, comprising covering the top and also the flanks and surrounding area of the mesa-like projection which is formed on the epitaxial layer and which is higher than the thickness of the epitaxial layer with a first metal electrode in the form of a layer, the original disc-shaped semiconductor crystal being then uniformly removed on the side opposite the mesa-like projection until the metal of the first electrode covering the surroundings of the mesa-like projection is exposed on the removal side, in the form of a ring surrounding the base of the mesa-like projection, which latter contains a residue of the epitaxial layer and of the original semiconductor crystal, then providing the semiconductor surface which has been newly formed by the removal process with an etching mask which is separated in insular fashion from the first metal electrode and in the form of a second metal electrode, with the aid of which further semiconductor material being etched away until the junction between the basic material and the epitaxial layer in the semiconductor residue formed by the former mesa-like projection is no longer short-circuited by the metal of the first electrode.

3,903,593

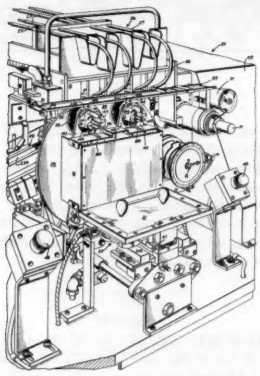
METHOD FOR HANDLING MAGNETIC CORES AND PERFORMING WINDING TREATMENT PROCEDURES

Lowell M. Mason, Fort Wayne, Ind., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 189,616, Oct. 15, 1971, Pat. No. 3,812,570. This application Nov. 14, 1973, Ser. No. 415,502

Int. Cl.[2] H02K *15/085*

U.S. Cl. 29—596 2 Claims



1. A method of handling different sets of cores and providing windings thereon, said method including the steps of: moving a first set of cores to a core loading station; transferring the cores of the first set to a core set transporter; transporting the first set of cores to a winding station; substantially simultaneously placing windings on each core in the first set of cores at the winding station; establishing lead wires of a predetermined length for at least one winding coil of each core in the first set of cores at the winding station and, at that time, establishing at least one lead wire of a predeterminable length for each core of another set of cores; transporting the wound first set of cores to the core loading station; and removing the wound first set of cores from the core loading station.

3,903,594

METHOD OF MAKING ELECTROGRAPHIC RECORDING HEADS EMPLOYING PRINTED CIRCUIT TECHNIQUES

Donald J. Koneval, Arlington Heights, Ill., assignor to Gould Inc., Chicago, Ill.

Filed May 28, 1974, Ser. No. 473,444

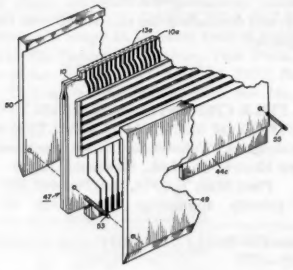
Int. Cl.[2] G11B *5/42*

U.S. Cl. 29—603 11 Claims

1. The method of fabricating an electrographic recording head having at least one row of recording electrode areas which comprises:

on a sheet of flexible circuit board material comprising a substrate of insulative material, defining by means of parallel severance lines and elongated rectangular expendable portion, and first and second electrode conductor supporting portions flanking said expendable portion; forming on said first conductor supporting portion a first row of electrode conductors; and forming on said second conductor supporting portion a second row of electrode conductors; each of said conductors of said first and second rows being formed on the same face of said sheet of material, and extending across the adjacent one of said severance lines and at least partially over said expendable portion;

folding said sheet with the bend of said fold located along the center of said expendable portion thereby bringing into close proximity to each other areas of said first and second electrode supporting portions which are adjacent to said expendable portion, and also bringing into close proximity to each other areas of said expendable portion which are adjacent to said conductor supporting portions; securing together said areas which are in close proximity to each other; and



severing said expendable portion, including the extensions thereover of said electrode conductors, from said secured together areas of said first and second conductor supporting portions, thereby exposing a cross sectional area of each of said conductors to establish said recording electrode areas.

3,903,595

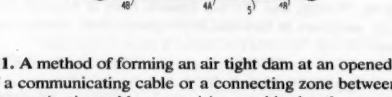
METHOD OF FORMING AN AIR TIGHT DAM FOR COMMUNICATION CABLES

Toshihisa Takada, and Yukio Matsui, both of Tokyo, Japan, assignors to The Fujikura Cable Works, Limited, Tokyo, Japan

Division of Ser. No. 380,025, July 17, 1973. This application Apr. 9, 1974, Ser. No. 459,439

Int. Cl.[2] H01R *43/00*

U.S. Cl. 29—628 4 Claims

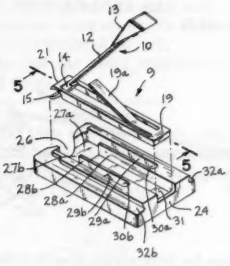


1. A method of forming an air tight dam at an opened zone of a communicating cable or a connecting zone between two communicating cables comprising a cable sheath surrounding an insulated conductor body, said method comprising the steps of: inserting at least one slit spring sleeve capable of compressing the cable sheath and the insulated conductor body in an outer sleeve which covers said opened zone or said connecting zone, expanding said slit spring sleeve during insertion, maintaining the sleeve in expanded condition while pouring a room-temperature setting resin exhibiting pentration hardness (JIS-K-2530) of about 2 to 7 mm/100 g. 5 sec at 25°C after setting, in said spring sleeve to fill the latter, setting said filled resin, and contracting the spring sleeve to compress the interior of the dam at a pressure of about 2 to 6 Kg/cm^2 gauge.

3,903,596
ECOLOGY NAIL-CLIP RESERVOIR DEVICE

Kenneth R. Crosby, 128 Fort Washington Ave., New York, N.Y. 10032

Continuation-in-part of Ser. No. 462,253, April 19, 1974, Pat. No. 3,855,698. This application Sept. 27, 1974, Ser. No. 510,112
Int. Cl.² B26B 13/22
U.S. Cl. 30—29 9 Claims



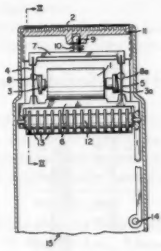
1. A nail clip device comprising in combination: an enclosure means including a bottom member defining front and rear and lateral portions and a bottom section interconnecting the lateral portion and slot-recess structure of the bottom member defining a slot recess in the nature of a slot extending from the front to rear portions in an upper face of the bottom member and adjacent the side portion there being defined additional recess space communicating with the slot recess at a front portion, the additional recess space being defined also in the upper face of the bottom member, and there being a concave recess in the front portion in a front side wall therein defined in communication with a forward end of the slot recess, and the bottom member in the base of the slot recess forward end being shaped to stably receive a bottom face of a nail clipper means; a nail clipper means including upper and lower biased-apart clipping blades pivotably mounted for coordinate clipping action one relative to the other, the lower clipping blade including a stepped lever upper arm defining steps therein proximal to the blade thereof and distal lever portions spaced apart by a step portion, the clipper blade including an integral spring biased against a lower face of the lever upper arm, such that downward pressure on a terminal end of the lever upper arm is closable together of the upper and lower clipping blades; and an upper top member shaped to fit on top of the bottom member and to enclose therebeneath said nail clipper means and said slot recess and said additional recess and defining a through space at an end mounted over the terminal end of said distal lever portion for exterior access to press downwardly the terminal end of said distal lever portion.

3,903,597
DRY SHAVERS

Claus Christian Cobarg, Steinbach, Germany, assignor to Braun Aktiengesellschaft, Frankfurt am Main, Germany

Filed Nov. 12, 1973, Ser. No. 414,767
Claims priority, application Austria, Nov. 15, 1972, 9719/72
Int. Cl.² B26B 19/02
U.S. Cl. 30—43.91 10 Claims

1. In a dry shaver,
in combination,
a first member including a rotatable, endless, flexible belt-type perforated cutting screen;
a second member including a shearing head positioned in operative contact with at least a portion of said screen;
suspending means operable for suspending the screen rotatably;
said suspending means comprising a roller means including at least one roller and being operable, in combination with said second member, for maintaining said cutting screen in a circumferentially extended position by suspending the screen non-circularly; and
reciprocating means operable for reciprocably moving one of said members relative to the other a holding means;

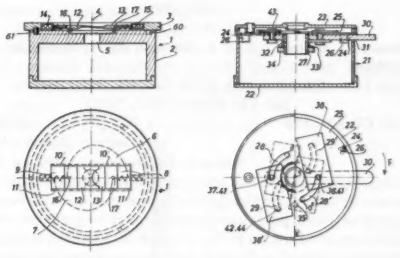


said roller means being pivotally suspended from said holding means,
a casing;
said holding means including a cantilever operable for pivotally securing said holding means to said casing.

3,903,598
CIGAR CUTTER

Philippe Pierre Lefebvre, Arras, France, assignor to Societe Anonyme: S.T. DuPont, Paris, France

Filed Jan. 7, 1974, Ser. No. 431,565
Int. Cl.² A24C 5/12
U.S. Cl. 30—112 12 Claims



1. A cigar cutter comprising first and second parts pivotably connected together, two cutting blades mounted on said first part, said second part having a central hole adapted for insertion of a cigar end thereinto, and means coupling said blades with said second part for effecting simultaneous displacement of said blades both radially and rotatably as said first part is pivoted relative to said second part so that the blades cut the end of the cigar with progressively deepening circumferential cuts.

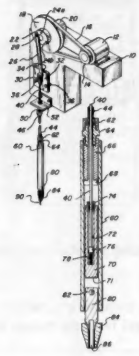
3,903,599
IMPACT ENGRAVING TOOL

Archie C. Ray, Rt. 1, Box 15, Powell, Wyo. 82435

Filed Nov. 15, 1974, Ser. No. 523,993
Int. Cl.² B26F 1/34
U.S. Cl. 30—362 7 Claims

1. A hand held impact engraving tool comprising
a. frame means;
b. an elongated, flexible cable reciprocably mounted in a sheath adjustably secured to said frame means;

c. means including an electric motor for variably reciprocating said cable in said sheath;
d. housing means mounted on the end of said sheath and arranged to be hand held and including a reciprocable graving tool chuck means;
e. piston means reciprocably mounted in said housing means and arranged to impinge on said chuck means;



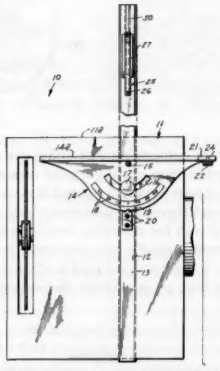
f. hammer means secured to the end of said flexible cable and mounted in said piston means and reciprocable therein; and
g. compression spring means in said piston means positioned to be impinged on by said hammer means for reciprocating said piston means against said graving tool chuck means.

3,903,600

ELECTRIC HAND SAW GUIDE

Homer L. Dalton, c/o D. L. Kinney, Rt. 1, Rochester, Tex. 79544

Filed Nov. 20, 1974, Ser. No. 525,585
Int. Cl.² B23D *47/02, 51/02*
U.S. Cl. 30—376 **3 Claims**



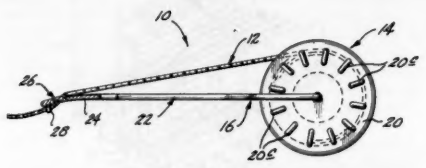
1. An electric hand saw guide, comprising a pair of guide bar members of each of a different length, clamp means carried by the longer of said guide bars, a dove tail grooved base plate secured to an electric hand saw for receiving said guide bar, a mitre guage secured to said guide bar with pointer means and adjustment screw means, a thumb plate extending from said mitre guage with spring and point means for preventing the saw from vibrating off mark and a calibrated and arcuately configurated plate secured to said base plate with wing fastener means for adjusting for an angle of cut on the vertical plane.

3,903,601

DISPENSER FOR ORTHODONTIC CHAIN-FORMED INTRAORAL DEVICES

Roland M. Anderson, and Paul E. Klein, both of Lake Oswego, Oreg., assignors to Modcom, Inc., Canby, Oreg.

Filed July 11, 1974, Ser. No. 487,664
Int. Cl.² A61C *7/00*
U.S. Cl. 32—14 D **15 Claims**



1. Apparatus for dispensing intraoral orthodontic devices of the type which are severably joined in an elongated flexible chain, with each device in such a chain including an aperture, said apparatus comprising
a digitally manipulatable dispenser portion including means therein defining a guide for guiding the dispensing of devices from such a chain,
a storage portion mounted for movement on and relative to said dispensing portion for storing a chain of devices, movement of said storage portion relative to said dispensing portion effecting taking-up and paying-out of a stored chain,
a chain of devices when stored in the apparatus in a condition for the dispensing of devices therefrom having a reach extending between said storage portion and said guide, and
means on said dispensing portion employable releasably to lock a chain in place against dispensing movement relative thereto.

3,903,602

BIB AND COMBINATION THEREOF WITH BITE TRAY

Russell J. Jones, 13804 Lake Shore Dr., Bratenahl, Ohio 44110.

Filed Apr. 12, 1974, Ser. No. 460,430
Int. Cl. 161C *9/00*
U.S. Cl. 32—17 **7 Claims**

1. A bib for a bite registration frame having a pair of laterally spaced, stiff, resilient wire side frame members and comprising:
a strip of thin, flexible, soft, open mesh, sheet material;
elongated, straight, channel members connected to the lateral margins of the strip, respectively;
each channel member having a frame receiving portion near its bottom and extending endwise of the channel member for the full length of the channel member, and having side walls defining a radially open restricted entry passage and outwardly divergent guide walls leading to the entry passage and being coextensive endwise with the channel members, respectively, so as to be capable of receiving the side frame members, respectively, of a bite tray by insertion of the side frame members radially thereinto;

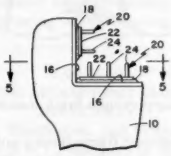
said channel members being composed of resiliently distortable self-restoring set plastic material capable of clamping engagement with the wire frame members, respectively, when the members are inserted radially into the frame receiving portions thereof through the radial entry passages, respectively;
the ends of the strip terminating at the ends of the channel members and being free;
said margins of said strip being interpenetrated by the set plastic material of the channel members, respectively, for the full length of the strip; and
each channel member being resiliently resistant to flexure transversely of its longitudinal axis;
characterized in that the sheet material is of unwoven loosely felted fibres.

3,903,603

DENTAL PIN INTERFACE PLATE

John Kennard, 222 F Ave., Coronado, Calif. 92113

Filed Aug. 23, 1974, Ser. No. 499,835
Int. Cl.² A61K *5/02*
U.S. Cl. 32—15 **6 Claims**



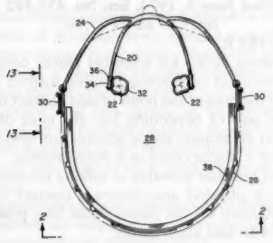
1. An interface plate for use in bonding dental amalgam to a prepared surface of an injured tooth comprising:
a corrosion-resistant plate element dimensioned to cover a portion of a prepared tooth surface;
one side of said plate element being a cement-receiving side contoured to fit substantially flushly against a prepared tooth surface; and
the other side of said plate element having at least one projection integral with and supported by said plate element to engage amalgam, said projection being dimensioned to lie entirely within the projected external restored surface of a tooth when said plate element is cemented to a prepared surface thereof.

3,903,604

SECURING MEANS FOR ORTHODONTIC APPLIANCE

Wilford A. Snead, West Covina, Calif., assignor to Ormco Corporation, Glendora, Calif.

Filed Feb. 13, 1974, Ser. No. 442,281
Int. Cl.² A61C *7/00*
U.S. Cl. 32—14 D **10 Claims**



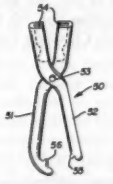
1. Orthodontic appliance comprising:
an inner arch;
a face bow secured to said inner arch;
each end of said arch being adapted to extend through a respective buccal tube secured to a tooth, and having stop means bearing against said tooth to apply a retractive force to the tooth;
manually actuable locking means forming an interengagement between each said end and its respective tube for preventing undesired removal of said arch from said tube;
a first member and a second member slideably mounted with respect to each other;
said first member being adapted to being secured to the end of a neck strap or retaining head gear;
said second member forming at least a part of the end portion of said face bow;
a first hook extending laterally from said first member;
a second hook extending laterally from said second member;
an elongate tension member tensioned between said hoods; and
stop means on said first and second members respectively, and engageable with each other to limit the extensibility of said tension member and to prevent undesired separation of said first and second members.

3,903,605

ENDODONTIC SEALING SYSTEM AND APPARATUS

Oscar Malmin, 127 E. Wayne Ave., Akron, Ohio 44301

Division of Ser. No. 368,480, June 11, 1973, Pat. No. 3,863,345, which is a division of Ser. No. 213,993, Dec. 30, 1971. This application Apr. 26, 1974, Ser. No. 464,651
Int. Cl.² A61C *3/00*
U.S. Cl. 32—40 R **3 Claims**



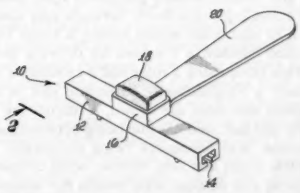
1. Spatula means comprising;
A. a thin flat blade having
1. first and second ends and
2. opposed substantially parallel edges with opposed notches spaced from and disposed adjacent said first end;
B. a plier-like gripping member having
1. a handle portion and
2. an interconnecting jaw portion;
C. said jaw portion of said gripping member having opposed jaw members removably holding said blade each of which has an elongate internal recess extending along its longitudinal axis with the bottom wall of each said recess being deformed adjacent one end thereof to form a protuberance that is shaped substantially complementally with said notches on said blade.

3,903,606

DENTAL TOOL

Richard B. Oliver, 5418 Andrew Dr., La Palma, Calif. 90623

Filed June 7, 1974, Ser. No. 477,438
Int. Cl.² A61C *3/00*
U.S. Cl. 32—40 R **8 Claims**



1. A dental tool for transmitting biting pressure from the occlusal surfaces in one arch to separate locations on the

opposed occlusal surfaces in the other arch comprising:

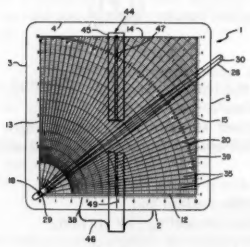
means for contacting generally opposed teeth, said means for contacting defining generally a working plane through which biting pressure is transmitted from one arch to another;

means for positioning said means for contacting in working position, said means for positioning being positioned generally in a positioning plane, said working plane and said positioning plane being approximately perpendicular to one another, said means for contacting including an elongated track member, a plurality of independently movable support members mounted for movement along said elongated track member, and a bearing member, said bearing member projecting outwardly approximately in said working plane to contact occlusal surfaces in one arch, said movable support members projecting generally opposedly outwardly in approximately said working plane to contact the opposed occlusal surfaces in the other arch at separate locations.

3,903,607
TRIGONOMETRIC COMPUTER

Wayne B. Easton, 3007 W. 96th St. Cir., Bloomington, Minn. 55431

Continuation-in-part of Ser. No. 10,384, Feb. 11, 1970, abandoned. This application Apr. 10, 1972, Ser. No. 242,579
Int. Cl. G06g *1/00*
U.S. Cl. 33—76 R **5 Claims**

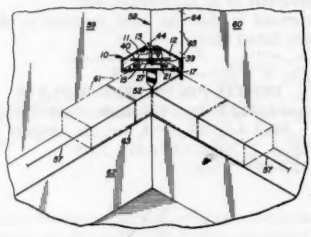


1. A device for computing sides and angles of right triangles, comprising, a base plate element having a planar surface, intersecting orthogonal axes indicated on said surface, said base plate element having two edges thereof in parallel relation respectively with said axes, graduated angular scale means on said base plate having a range from zero to 90 degrees for indicating angles between said axes and having a center which coincides with the intersection of said axes, radial scale means on said base plate for indicating radial distances of points on said planar surface from said center, horizontal and vertical linearly graduated scale means on said base plate extending respectively between said axes and said edges, each of said scale means having a range from 0 to a predetermined number, a T-square for drawing lines on said planar surface comprising a ruler and a crosspiece at one end of said ruler, a longitudinally extending slot in said ruler through which said lines are drawn, a hairline on said ruler aligned with said slot, said hairline being between said slot and said crosspiece, said crosspiece being cooperable with said two base plate edges and said hairline being cooperable with said horizontal and vertical scale means for selectively positioning said T-square relative to said horizontal and vertical scales.

3,903,608
BRICK MASON'S INSIDE CORNER LINE-SUPPORTING DEVICE

Willie Garrison, 1517 Kimmell Ln., Dayton, Ohio 45418, and Michael D. Van Meter, 554 Seymour Ave., Columbus, Ohio 43205

Continuation-in-part of Ser. No. 324,404, Jan. 17, 1973, abandoned. This application Oct. 23, 1974, Ser. No. 517,368
Int. Cl.² G01C *15/10*
U.S. Cl. 33—85 **3 Claims**



1. A device for supporting a brick mason's guide line comprising:

a. a generally V-shaped frame having angularly related side legs and arranged to fit horizontally within an inside corner defined by a pair of angularly converging building walls;

b. a plurality of wall-penetrating pins carried on said frame for movement between relatively outwardly extended and inwardly retracted positions with respect to the side legs of said frame;

c. manually operable means mounted on said frame and connected with said pins for moving the same between said outwardly extended and inwardly retracted positions, said pins when extended being effective to engage said walls and to hold said frame in a selected position between said building walls; and

d. a line-holding member carried by said frame and adjustable thereon along a line bisecting the angle between the side legs of said frame for holding a guide line in predetermined position with respect to said inside corner.

3,903,609
ADJUSTING DEVICE FOR LUMBER PLANER

Fred E. Brown, 20412 Alameda St., Castro Valley, Calif. 94546

Filed June 3, 1974, Ser. No. 475,492
Int. Cl.² B27G *23/00*
U.S. Cl. 33—185 R **1 Claim**

1. An adjusting device for a lumber planer comprising:

a. a non-electrical conducting housing formed with indent means in the area of the point of said contact member and having a pair of depending legs the ends of which are formed in an arcuate shape adapted for resting upon the surface of a planer drum in a stable stance;

b. a contact member movable in infinite increments from a position in physical and electrical contact with a knife blade mounted on the planer drum to a position out of contact with said knife blade;

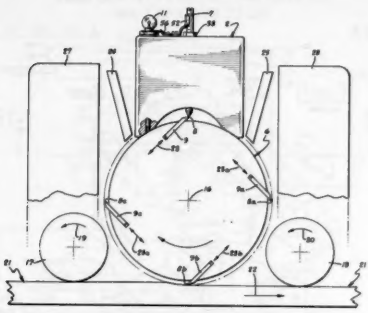
c. a light-emitting device mounted on said housing;

d. power means including a dry cell battery for energizing said light-emitting device;

e. ground means mounted for reciprocal movement within one of said housing legs and electrically connecting said drum and said energizing means;

f. an electrical circuit connecting said contact means and said power means;

g. spring means biasing said ground means into contact with said drum; and

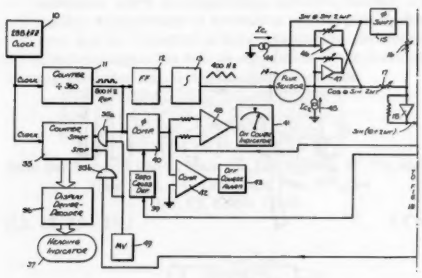


h. said contact member being threadably engaged by mating threads in an opening in said housing.

3,903,610
APPARATUS FOR MEASURING MAGNETIC FIELD DIRECTION

John B. Heaviside, Huntington, and Franklin W. Smith, Jr., Hauppauge, both of N.Y., assignors to North Atlantic Industries, Inc., Plainview, N.Y.

Continuation-in-part of Ser. No. 282,002, Aug. 18, 1972. This application Oct. 4, 1972, Ser. No. 294,918
Int. Cl. G01c *17/28*
U.S. Cl. 33—361 **22 Claims**



1. Apparatus for measuring the direction of a magnetic field in the presence of deviation error sources including:

a. flux sensor means comprising a magnetic member, said sensor having a plurality of sensor outputs;

b. excitation means operably connected to said flux sensor for saturating said flux sensor in the presence of said magnetic field to thereby produce sensor output signals which are functions of the relative direction of said magnetic field with respect to a predetermined axis of said flux sensor;

c. means responsive to said sensor output signals for deriving therefrom an output signal proportional to said relative direction of said magnetic field;

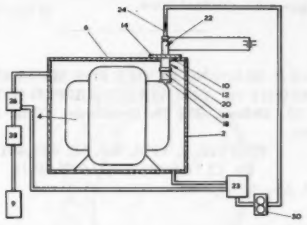
d. means responsive to said output signal for producing an indication of said relative direction of said magnetic field; and

e. compensation means operably connected to at least one of said sensor outputs for electrically compensating for magnetic deviation errors caused by said magnetic deviation error sources.

3,903,611
DRYING EQUIPMENT

Roland Gregor Paul Kusay, 6 Batterys Cross, Blechingley, England

Filed Nov. 20, 1973, Ser. No. 417,558
Claims priority, application United Kingdom, Nov. 22, 1972, 53957/72
Int. Cl. F26b *3/00*
U.S. Cl. 34—32 **4 Claims**

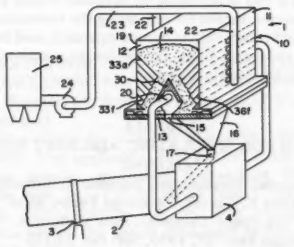


1. A method of drying water from electrical equipment by transferring heat to it by the condensation on it of saturated or superheated vapour of a liquid of a member of the class consisting of white spirit, light oil and kerosene, including the steps of positioning an electrical heater having a permeable hollow cylindrical body of electroresistive material within the interior of a vacuum-tight container housing the equipment to be dried; supplying liquid to the heater; forcing said liquid through the body while passing electrical current therethrough of amplitude sufficient to generate sufficient Joule heat to vaporise substantially all the liquid entering the heater and continually evacuating the interior of the container and removing both the liquid vapour and desorbed water vapour.

3,903,612
APPARATUS FOR PREHEATING SOLID PARTICULATE MATERIAL

Jay Warshawsky, Allentown, and Thomas R. Lawall, Emmaus, both of Pa., assignors to Fuller Company, Catasauqua, Pa.

Filed June 26, 1974, Ser. No. 483,265
Int. Cl. F26b *17/14*
U.S. Cl. 34—168 **11 Claims**



1. A gas-solids heat exchange apparatus including a vessel having an inlet for solid particulate material, an outlet for solid particulate material, an inlet for gaseous fluid and an outlet for gaseous fluid; means defining a gas-solids contact zone intermediate said inlet and said outlet for gaseous fluid and intermediate said inlet and said outlet for solid particulate material whereby solid particulate material which moves from said inlet for solid particulate material to said outlet for solid particulate material passes through the gas-solids contact zone; means for directing substantially all of the gaseous fluid through the gas-solids contact zone for heat exchange contact with the solid particulate material; and means for varying the

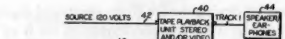
length of the gas-solids contact zone through which substantially all of the gaseous fluid is directed; the improvement comprising said means for varying the length of the gas-solids contact zone including a plurality of conduits having their inlets positioned along the length of said gas-solids contact zone and their outlets flow connected to the outlet for gaseous fluid; and a plurality of valve means, each mounted in one of said conduits for controlling the flow of gas from said gas-solids contact zone to the outlet for gaseous fluid through the conduit in which it is mounted to thereby control the length of the gas-solids contact zone.

3,903,613

BICYCLE TRAINING DEVICE FOR SIMULATING THE MOVEMENT OF A BICYCLE EQUIPPED WITH GEARS

Aaron M. Bisberg, 499 N. Broadway, White Plains, N.Y. 10603

Filed Feb. 7, 1974, Ser. No. 440,401
Int. Cl.² G09B 9/04; A63B 69/16
U.S. Cl. 35—11 **13 Claims**



8. A bicycle training device for simulating the movement of a bicycle equipped with gears and for simulating road conditions when a bicycle enters a resistance situation, which device comprises rotary means in the form of a bicycle wheel having rotatably mounted pedals connected thereto, said bicycle wheel having a gear assembly comprising a plurality of gears connected to a means for selectively connecting said bicycle wheel to said pedals through each of said gears, one gear at a time, which bicycle wheel is revolvable about a horizontal axis and is driveable by rotation of said pedals by a bicycle operator, means for regulating the resistance against rotation of said rotary means by said operator, said means for regulating a resistance being responsive to a manual control means fed by an electric current.

3,903,614

APPARATUS FOR SIMULATING AIRCRAFT CONTROL LOADING

John A. Diamond, Binghamton; Amedeo A. Sylvester, Endicott, and Fred F. Carver, Chenango Forks, all of N.Y., assignors to The Singer Company, New York, N.Y.

Filed Mar. 27, 1970, Ser. No. 23,153
Int. Cl.² G09B 9/08
U.S. Cl. 35—12 S **8 Claims**

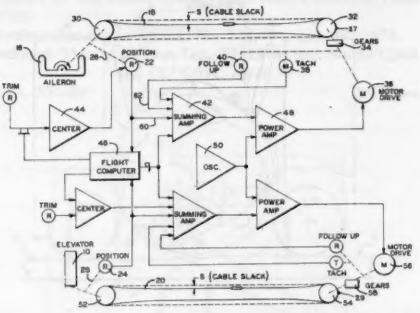
1. A control loading system including motive means for providing a realistic opposing force to the manual movement of a simulated aircraft control member in a fixed-base flight simulator, said system comprising, in combination:

a. means for deriving a first electrical signal commensurate with the position of said control member;

b. means for deriving a second electrical signal commensurate with the position of said motive means;

c. means for deriving a control signal commensurate with the difference between said first and second signals to drive said motive means;

d. a flexible non-elastic cable connecting said control member and said motive means for transmission of motion and force from one to the other; and



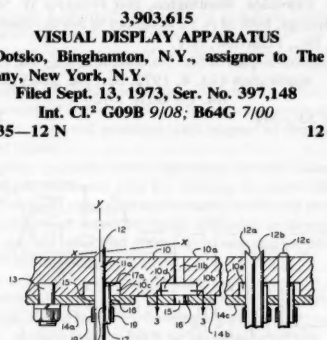
e. said cable having a predetermined amount of slack, sufficient to allow differential movement between said control member and said motive means which produces a differential between said first and second electrical signals.

3,903,615

VISUAL DISPLAY APPARATUS

Martin Dotsko, Binghamton, N.Y., assignor to The Singer Company, New York, N.Y.

Filed Sept. 13, 1973, Ser. No. 397,148
Int. Cl.² G09B 9/08; B64G 7/00
U.S. Cl. 35—12 N **12 Claims**



11. Apparatus for use in simulating airfield lighting comprising:

a first plate member having a representation of an airfield on a first of its sides and a through hole extending from said first side to an opposite side;

an optical fiber having a longitudinal axis, said fiber extending through said hole in said first plate member so that an end of said fiber protrudes beyond said first surface;

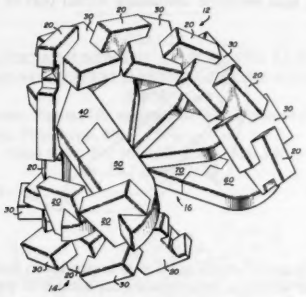
a keying element affixed to said optical fiber at a predetermined distance and angular orientation relative to said fiber end, said keying element abutting against said first member to limit the extent of protrusion of said fiber end; and

means, associated with said first plate member, for receiving said keying element, and, in cooperation with said keying element, limiting rotational movement of said fiber about its longitudinal axis, whereby the end of said fiber is positioned with a precise angular orientation and predetermined protrusion relative to said first side of said first plate member.

3,903,616
MOLECULE MODEL CONSTRUCTION KIT

Portia L. Gage, 203 Willow Rd., Menlo Park, Calif. 94025

Filed Nov. 7, 1974, Ser. No. 521,736
Int. Cl.[2] G09B *23/26*
U.S. Cl. 35—18 A 6 Claims



1. A kit for constructing a molecule model having a helical twist therein, comprising

a first plurality of rigid members representing a first submolecule,

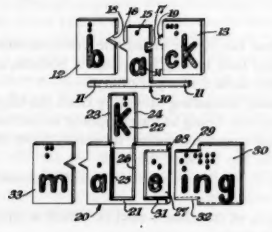
a second plurality or rigid members representing a second submolecule,

each of said first and second members having first and second asymmetrical notches in respective edges thereof, the first and second asymmetrical notches of each of said first plurality of members being conformably shaped to the first and second asymmetrical notches, respectively, of each of said second plurality of members, such that each of said first members is keyed to each of said second members when corresponding notches thereof are in mating engagement to provide a self-supporting formation and to maintain a fixed orientation therebetween which simulates the helical orientation of the corresponding submolecules in the simulated molecule.

3,903,617
EDUCATIONAL DEVICE

Jetta Sue Evans, 1105 E. Main St., Clarksburg, W. Va. 26301

Filed Sept. 14, 1973, Ser. No. 397,384
Int. Cl. G09b *17/00*
U.S. Cl. 35—35 J 5 Claims

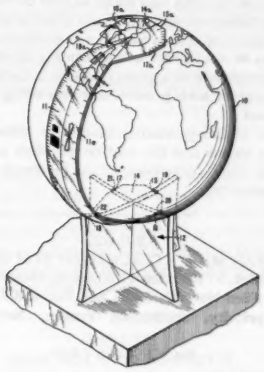


1. An educational device for use in teaching spelling, which device comprises a base structure and a plurality of block-like elements, each element containing thereon a letter or a group of letters and containing a locking mechanism to afford its locking with another element only if the locking mechanisms match to spell any word or a part of any word and each element being capable of being placed in spelling relationship with other of said elements on said base structure that is representative of a line, there being among the plurality of block-like elements a plurality of different locking mechanisms of which only like locking mechanisms can lock together, thereby assuring correct matching in spelling.

3,903,618
GLOBE STAND AND MEASURING DEVICE

Richard K. Rogers, Falls Church, Va., assignor to National Geographic Society, Washington, D.C.

Filed Sept. 12, 1974, Ser. No. 505,277
Int. Cl. G09b *27/08*
U.S. Cl. 35—46 R 8 Claims

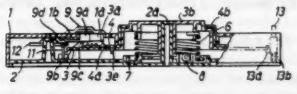


1. A globe stand and measuring device comprising a base member and a C-shaped globe-supporting and retaining measuring band adapted to clasp a globe and formed of resilient material having a preformed curvature with a radius slightly less than the radius of the globe to be clasped, said band having measuring indicia thereon, said base member and an interfitting portion of said band having cooperating means to removably engage and support the band with a globe clasped thereby in a upright position on the base so that the band with a clasped globe may be removed from the supporting base for a desired manipulation of the measuring band and globe to thereby utilize measuring indicia in the vicinity of the interfitting band portion.

3,903,619
APPARATUS FOR PLAYING AN EDUCATIONAL GAME INCLUDING MOVEABLE SETTING MEANS

Walter Hesener, 66, Rue de la Prulay, 1217 Meyrin, Geneva, Switzerland

Division of Ser. No. 129,469, March 30, 1971, Pat. No. 3,780,453. This application July 25, 1973, Ser. No. 382,502
Claims priority, application Switzerland, Mar. 3, 1970, 4696/70; Mar. 29, 1970, 8136/70; Sept. 5, 1970, 13300/70; Nov. 20, 1970, 17285/70; Nov. 30, 1970, 17659/70. The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.
Int. Cl. G09b *3/00*
U.S. Cl. 35—48 R 15 Claims



1. Apparatus for playing an educational game comprising: a cover;

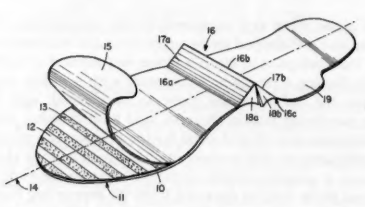
a code bearing means at least partly concealed by the cover;
means for permitting relative movement between said code bearing means and at least one part of said cover;
a plurality of code means on the code bearing means;
at least one setting means carried by said one part of the cover and movable relative thereto to at least two answer positions;
said at least one setting means being constructed in the form of a slider slidable relative to the said one part and having a first portion which include means for co-operating with the code means and a second portion which is external of the cover and by which a player of the game can move the slider between its possible positions;
means for connecting said slider to said cover and for permitting sliding movement of said slider in a first direction into any one of at least two answer positions, each answer position of said slider corresponding to one of several possible answers to a given question associated with said slider, one of such possible answers being a correct answer; and
means for blocking relative movement between the code bearing means and the said cover when a slider is in a position which corresponds to an incorrect answer to the given question.

3,903,620

CLEAN SOLE ATTACHMENT FOR SHOES

Lucien A. Gillet, 57 Rue Henri Richaume, Montesson, France

Filed Nov. 23, 1973, Ser. No. 418,730
Claims priority, application France, Nov. 24, 1972, 72.41940
Int. Cl. A43b *13/00*
U.S. Cl. 36—25 R **13 Claims**



1. In a clean sole attachment for removably attaching to the bottom of a shoe wherein the shoe has a longitudinal axis, the combination of
A. a generally planar cover having a ground contacting surface and a shoe contacting surface,
1. said shoe contacting surface being provided with means to affix the cover to the shoe,
2. said means permitting removal of the cover from the shoe by the application of removal forces,
3. said means comprising adhesive zones interspersed with non-adhesive zones,
4. the adhesive zones being disposed in the configuration of parallel stripes,
5. the stripes being positioned at an angle with the longitudinal axis.

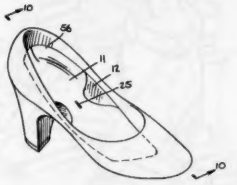
3,903,621

CONFORMING SUPPORTIVE INNERSOLE DEVICE

Benjamin B. Dubner, 229-02 Merrick Rd., Laurelton, N.Y. 11413

Filed Sept. 26, 1974, Ser. No. 509,439
Int. Cl.² A43B *13/38*
U.S. Cl. 36—44 **7 Claims**

1. A supportive innersole device for use in a shoe or boot, comprising: A first relatively upwardly positioned innersole element conforming generally to the shape of the sole and sides of a shoe or boot and extending generally from the area of the ball of the foot to the back of the heel, with generally semi-circular areas cut out of opposing sides of the central part; a second innersole element, partially disposed beneath said first innersole element's cut out areas, and extending outwardly on each side form a generally dumbbell configuration, the two innersole elements being attached to each other at a central point; a flexible envelope underlying the innersole elements, said envelope containing within part of its area a



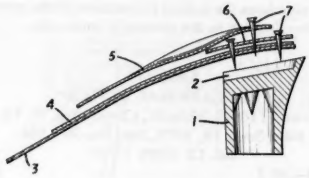
resilient cushion, which cushion is imperviously sealed on all sides, and which is imperviously connected to parts of the upper and lower sides of the envelope; a rolled semi-flexible piece within the envelope, said piece being connected to the front of the envelope, which front edge is shaped to permit easy tucking in of the front edge of the envelope within itself; an open sleeve into the envelope, said sleeve containing means for self sealing.

3,903,622

FOOTWEAR LAYOUT

Miguel Lopez Penalver, Alicante, Spain, assignor to Miguel Lopez Penalver, S.A., Alicante, Spain

Filed May 17, 1974, Ser. No. 471,019
Claims priority, application Spain, Mar. 28, 1974, 201810
Int. Cl.² A43B *13/42*
U.S. Cl. 36—76 R **1 Claim**



1. In a shoe having an instep the combination comprising:
a. a heel, said heel having a top and a bottom, a front and a back and two sides and a periphery;
b. a shoulder extending upwardly from the top of said heel, said shoulder being at the periphery of the heel and being continuous and extending upwardly from the two sides and from the back of the heel;
c. a plurality of layers affixed to said heel said plurality of layers including:
i. the sole of the shoe a part of which is adjacent the top of the heel;
ii. a layer of cardboard adjacent and on top of the sole;
iii. a metal plate adjacent and on top of said layer of cardboard;
d. said plurality of layers being affixed to said heel by at least two wood screws;
e. a shank piece adjacent to and on top of said metal plate, said shank piece:
i. extending to the instep of the shoe;
ii. having a longitudinal extent and having a central recess therein whereby the shank piece is reinforced;

iii. being affixed to the said heel by at least one wood screw;

f. the total height of the said plurality of layers in combination with the shank piece being less than the height of the said upwardly extending shoulder;

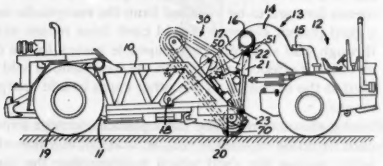
g. an insole on top of and immediately adjacent the shank piece.

3,903,623

AUTOMATIC ADJUSTMENT OF SCRAPER ELEVATOR USING SERVO SYSTEM HAVING GROUND ENGAGING SHOE

John H. Hyler, Peoria, Ill., assignor to Westinghouse Air Brake Company, Pittsburgh, Pa.

Filed Sept. 30, 1974, Ser. No. 510,143
Int. Cl.[2] B60P *1/36*
U.S. Cl. 37—8 **5 Claims**



1. In an elevating type scraper for earth moving purposes, the combination comprising an open-fronted bowl having sides, back wall and a floor, ground wheels for supporting the bowl and mounted behind the back wall, a scraper blade extending along the front edge of the floor, a tractor-supported draft frame, a pair of draft members pivotally secured at the rear ends to the sides of the bowl and extending forwardly and upwardly having rigid connection at their front ends to the draft frame, means including an actuator interposed between the draft frame and the front end of the bowl and having control means for determining the degree of tilt of the bowl about its supporting wheels and hence the depth of cut of the blade, an elevator positioned at the open front end of the bowl, the elevator having a frame which extends upwardly and rearwardly from the region of the blade and which is pivoted to the bowl for swinging movement about a transverse axis, the elevator having a pair of endless chains with transversely arranged flights, the chains having means for driving at the upper end of the frame and trained about rollers at the lower end so that the flights sweep the soil loosened by the blade backwardly into the bowl, means including an elevator hoist cylinder for supporting the elevator with respect to the ground, a ground engaging shoe floatingly mounted with respect to the lower end of the elevator frame for riding along the ground and movable in opposite directions from a reference position on the elevator frame as the elevator departs from a reference position above the ground, a servo valve on the elevator frame having a source of pressure fluid and a control element connected to the shoe, the servo valve being controllingly coupled to the elevator hoist cylinder so that the latter is correctively actuated to maintain the elevator at a desired sweeping height independently of the angle of tilt of the bowl, and means coupled to the servo valve for adjusting the maintained sweeping height.

3,903,624

APPARATUS FOR EXCAVATING, SHORING AND BACKFILLING A TRENCH

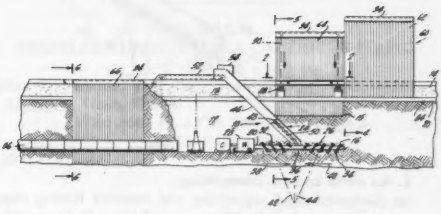
Edward J. Holl, 320 Warwick Ave., South Orange, N.J. 07079

Filed Apr. 3, 1973, Ser. No. 347,424
Int. Cl. E02f *3/06, 5/04*
U.S. Cl. 37—82 **5 Claims**

1. Apparatus for the continuous excavation of earth to form a trench defined by a lowermost surface and an uppermost surface comprising,

a cutting auger positioned below said uppermost surface for undercutting through the earth substantially along the horizontal central axis of said trench at said lowermost surface,

said cutting auger comprising a drive shaft integrally formed with a first continuous helical screw flyte, and a second continuous flyte formed with a helix angle opposite to the helix angle of said first continuous flyte,



said cutting auger being embedded in the earth substantially along the entire length of said auger and along said horizontal central axis of said trench such that the earth along said lowermost surface is dislodged and moved toward a central position between said continuous flytes, and

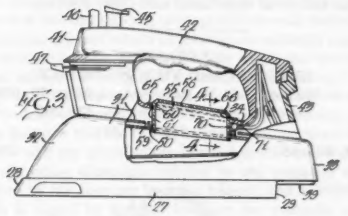
means for conveying the dislodged earth from said central position out of said excavation.

3,903,625

ELECTRIC PRESSING IRON

Robert John Augustine, Downers Grove, Ill., assignor to Sunbeam Corporation, Chicago, Ill.

Filed Nov. 29, 1974, Ser. No. 528,181
Int. Cl.[2] D06F *75/06*
U.S. Cl. 38—77.2 **5 Claims**

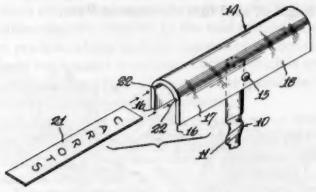


1. An electric steam pressing iron comprising a sole plate provided with an electric heating element and a shell overlying said sole plate and secured thereto; a controlled thermostat electrically connected in series with said heating element, a water reservoir mounted within said shell and adapted to deliver water to a steam chamber in said sole plate; a handle secured to said shell and having a gripping portion and a saddle portion in spaced parallel relation; an elongated opening in said reservoir extending parallel to said gripping portion; and elongated translucent dome mounted in said opening and sealed to said tank; said shell and said saddle portion having slots aligned with said reservoir opening with said dome extending through said slots; a power cord for said iron supported on said handle and being connected to said heating element; a neon light bulb electrically connected to said cord in parallel with the series combination of said heating element and said thermostat; means securing said bulb to the underside of said saddle portion between said saddle portion and said reservoir; said bulb being positioned adjacent said dome to direct light therethrough to illuminate the water level when said iron is in the upended position.

3,903,626
EARTH ANCHORS

John B. Ford, 6118 Webber-Cole Rd., Kinsman, Ohio 44428

Filed Aug. 19, 1974, Ser. No. 498,659
Int. Cl.[2] E02D 5/74; A45F 1/16; G09F 3/18
U.S. Cl. 40—10 C 4 Claims

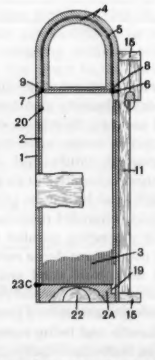


1. An earth anchor, comprising:
an elongated rigid supporting rod member having auger-type screw threads which extend from its lower tip to substantially the entire length thereof,
a head member which is U-shaped in cross-section with its legs pivoted to the upper end of said rod member intermediate the length of said head member to provide arms on either side of the pivot so that said head member may be swung from one position wherein it is disposed crosswise of said rod member, to another position wherein it is disposed longitudinally of said rod member,
the upper extremity of said rod member above the pivot being disposed within the confines of said head member when the latter is in said one position,
one arm of said head member encompassing at least a peripheral portion of the upper part of said rod member when said head member is in its other position,
said one arm having a transverse wall which spans the U-shaped cross-section of said head member, said wall having a keyhole opening providing marginal surfaces which engage said rod member with a snap fit to yieldably hold said head member in said other position.

3,903,627
KINETIC CARD VIEWING DEVICE

Rupert C. Herzog, 7651 N. Harlem Ave., Niles, Ill. 60648

Filed Jan. 19, 1973, Ser. No. 325,200
Int. Cl. G09f 11/30
U.S. Cl. 40—65 2 Claims



1. A device with a card receptacle means which contains a pack of cards, said receptacle being bounded by six rectangular walls which define an enclosure, the upper wall of said enclosure is provided with a card exit slot and a card entry slot in substantially parallel alignment, respectively, with the front and rear cards in said receptacle means;
the device includes a card passageway means with duct therein for the transfer of the cards individually in sequence from the front to the rear of the receptacle means, said card passageway means being seated on said upper wall of the receptacle means by its two ends of a cross-sectionally inverted U-shaped configuration, to which each terminus of said duct extends wherein it meets a slot in said upper wall of the receptacle means;
a card apart from the cards in the pack is provided and is located in the duct of the card passageway means preceding the start of operation of the device, upon operation of the device said card abuts and moves sequentially with the cards of the pack;
the wall of the receptacle means facing the front card of the cards in the receptacle means having a slot centered widthwise thereto for the card's full length and extending lineally therefrom such distance below the baseplane of the cards therein into the lower wall, to provide in a forward movement of a manually actuated card drive means for card to be expelled from the receptacle means, a card pusher element of said card drive means extends through said slot into the receptacle means to the depth at which it effects contact with the baseplane of said front card to the exclusion of the other cards in said receptacle means;
whereby the action of the card pusher element expells a card from the receptacle means, said last mentioned card bears against the card which is occupying the duct to move it therefrom through the card entry slot of the receptacle means from whence it is deposited in the receptacle means to become the backmost card of the cards therein, the wall of the receptacle means contiguous to the outer face of said backmost card constitutes the window for viewing the card, said window being composed of transparent material with its interior surface contoured so as to guide the incoming card, so that upon completing its entry into the receptacle means further means offsets said incoming card from said wall to provide a space between itself and said wall for entry of the next succeeding card;
a card drive retaining means attached adjacent to the wall of the receptacle means facing the front card of the cards in the receptacle means and structurally stabilized relative to said wall provides for a push/pull block adapted to be slid forward and backward by respectively pushing and pulling on said block aspect manually each way between two anchor blocks positioned on said card drive retaining means, to effect respectively the discharge of a card out of the receptacle means, and the restoration of the card drive means to the starting position of a card drive action, wherein said anchor blocks provide between them a measured distance to which the card drive means is held.

3,903,628
PERPETUAL FOUNTAIN

Jean-Pierre Goyeau, Sevres, France, assignor to Agence Nationale de Valorisation de la Rescherche (ANVAR), France

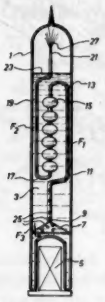
Filed Mar. 7, 1973, Ser. No. 338,941
Int. Cl. G09f 13/24
U.S. Cl. 40—106.21 13 Claims

1. A perpetual fountain comprising:
container means for holding a fluid at a determined level in said container means,
heat generating means for supplying heat to said fluid thereby forming bubbles in said fluid, said heat generating means being arranged at a bottom portion of said container means,
a collecting means for collecting fluid containing said bubbles, said collecting means being positioned in said bottom portion,
a conduit means contained in said container means for transporting said fluid from said bottom portion of said container to above said determined level, said conduit

means comprising in sequence from said bottom portion

a. a substantially vertical column connected to said collecting means for enabling said fluid and bubbles to rise, said column having a small diameter,

b. a substantially vertical member connected to the upper end of said column and extending downwardly, for



enabling said fluid and bubbles to descend, said member having an enlarged portion permitting said bubbles to condense, and

c. a substantially vertical tube connected to the bottom end of said member and extending upwardly for enabling fluid from said member to rise to an open point above said determined level of said fluid.

3,903,629

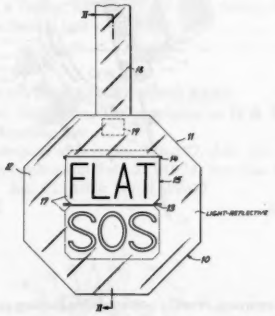
EMERGENCY SIGN FOR AUTOMOTIVE VEHICLES

Leo Gruna, 72-81 113th St., Forest Hills, N.Y. 11375

Filed Jan. 26, 1973, Ser. No. 326,807

Int. Cl.² G09F *21/04*

U.S. Cl. 40—129 C **7 Claims**



1. An emergency sign for use with automotive vehicles, comprising:

a frame provided with a pair of parallel slots defining a window for the display of a distress notice;

a flexible carrier passing through said slots, said carrier being divided into a plurality of sections each of a height substantially corresponding to the spacing of said slots, each of said sections having a front side provided with information visible between said slots upon alignment of the section with said window, said frame having a portion separated from said window by one of said slots and provided with a normally visible request for assistance;

a flap movably secured to said carrier at the junction of two adjoining sections thereof, said flap having a width less than the length of said slots so as to be extendible through said window to overlie said portion and conceal said request for assistance in a carrier position in which one adjoining section registers with said window, the information on said one adjoining section visible in said carrier position being a no-distress notice, the information on the other sections of said carrier being various types of distress notices said flap having a height greater than the distance between said slots for selective retention in said window; and

fastening means for securing said frame to a vehicle.

3,903,630

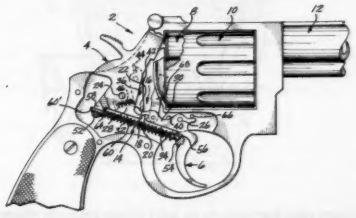
FIRING MECHANISM FOR A CARTRIDGE FIRING DEVICE

John T. Dirstine, Evergreen State College, Apt. M-302B, Olympia, Wash. 98505

Filed June 18, 1973, Ser. No. 371,264

Int. Cl. F41c *19/00*

U.S. Cl. 42—65 **4 Claims**



1. In a cartridge firing device, a firing mechanism comprising a hammer and a trigger pivotally mounted at spaced points and having portions thereof which relatively approach one another and define a multi-pointed cam connection therebetween, the points of which cam connection are relatively engageable and disengageable with and from one another when the hammer and the trigger undergo rotation with respect to a line through the pivot points thereof, and also having portions thereof which in general are mutually opposed to one another on one side of the line when the hammer and trigger are in the firing and at-rest positions thereof, respectively, an elongated rod, the respective end portions of which are pivotally connected with the mutually opposing portions of the hammer and the trigger at points spaced apart from the line through the pivot points of the hammer and the trigger, said rod being telescopic relative to the mutually opposing portions of the hammer and the trigger, and a coiled spring which is caged by the rod between the mutually opposing portions of the hammer and the trigger, so as to yield intermediate the ends of the rod when the points of the cam connection are relatively engaged with one another and a force is applied to one of the hammer and the trigger to rotate the points of the cam connection in the direction relatively away from the line on the other side thereof, and so as to rotate the hammer into its firing position when a force is applied to the trigger to relatively disengage the points of the cam connection from one another on the other side of the line, and then to rotate the trigger into the at-rest position thereof when the latter force is discontinued.

3,903,631

FIRING MECHANISM IN A FIREARM

Erkki Vesamaa, Jyvaskyla, Finland, assignor to Valmet Oy, Finland

Filed Mar. 11, 1974, Ser. No. 450,382

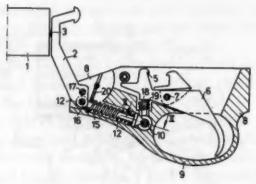
Claims priority, application Finland, Mar. 12, 1973, 749/73

Int. Cl.² F41C *17/00*

U.S. Cl. 42—70 R **9 Claims**

1. In a firearm, a hammer and support means supporting said hammer for swinging movement about a given axis be-

tween a cocked position and a firing position, and drive means operatively connected with said hammer for driving the latter from said cocked to said firing position, said drive means including an elongated rod means pivotally connected with and extending from said hammer and a spring means operatively connected with said rod means for storing a driving force when said hammer is placed in said cocked position thereof and for applying said driving force through said rod means to said hammer for driving the latter from said cocked to said firing position, said rod means having a free end portion distant from said hammer and said rod means being displaced by said spring means during movement of said hammer from said cocked to said firing position with said free end portion of said rod means moving during displacement of said rod means by said spring means along a predetermined path between a retracted end position occupied by said free end portion when said hammer is in said cocked position thereof and an extended end position occupied by said free end portion when said hammer is in said firing position thereof, and safety means carried by said support means for movement across said path of movement of said free end portion of said rod means, said safety means having a check position situated in the path of movement of said free end portion of said rod means and occupying the location which otherwise would be occupied by said free end portion of said rod means when said free end portion is in said extended end position thereof for preventing said free end portion of said rod means from reaching said extended end position thereof so as to prevent said hammer from reaching said firing position thereof, said safety means also being carried by said support means for movement across said path of movement of said free end portion of said rod means to an uncheck position where said safety means is clear of the location to be occupied by said free end portion of said rod means when said free end portion is in said extended end position thereof, whereby when said safety means is in said uncheck position thereof said hammer can be driven all the way up to its firing position.



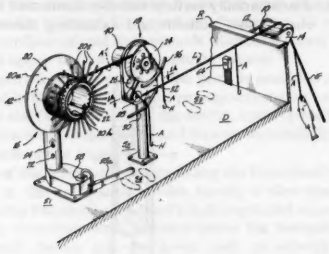
3,903,632

LONG LINE HAULING AND REEL STORAGE SYSTEM

Kenneth F. Tison, Seattle, and Olivier L. Tremoulet, Jr., Edmonds, both of Wash., assignors to Marine Construction & Design Co., Seattle, Wash.

Filed Apr. 25, 1974, Ser. No. 464,062
Int. Cl.² A01K *89/00*
U.S. Cl. 43—6.5 **15 Claims**

1. Long line hauling and reeling apparatus for fishing with a ground line having spaced gangions extended therefrom and at least one hook at the end of each gangion, comprising in combination with a rotatable line storage and pay-out spool having a central line storage hub with a plurality of circumferentially spaced hook-retainer spokes at one end projecting radially outwardly in relation to the hub: powered line hauling means operatively engageable with the ground line in running relationship therewith to haul in the long line under varying load tension in the ground line thereof, powered line reeling means operatively positioned in relation to the powered line hauling means and operable to support and rotate the line storage spool for drawing and winding up the ground line from said powered line hauling means under winding tension in the ground line substantially less than and independent of said load tension, and holding means positioned adjacent the reeling means temporarily delaying advancement of the gangions successively at a location adjacent the reeling means.

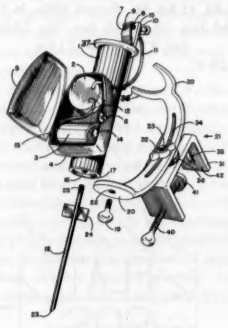


3,903,633

FISHING ROD HOLDER AND SIGNAL

Robert Hutcherson, 3141 Scarlet Oak Ave., Las Vegas, Nev. 89104

Filed June 26, 1974, Ser. No. 483,120
Int. Cl.² A01K *97/10, 97/12*
U.S. Cl. 43—17 **2 Claims**



1. A compact, readily assemblable fishing pole holder combined with a bite signal comprising:

a tubular rod holder having an open top and a closed bottom,

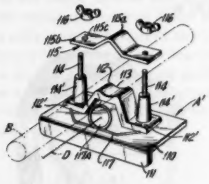
signal means carried by said tubular rod holder comprising an electrically actuated signal, a battery, and spring-mounted contact means for electrically connecting said battery and said signal situated such that a fish bite urges the fishing pole against the contact means and

a rod holder mounting device comprising a first arcuate member having a lower end adapted to be secured to the bottom of the rod holder and an upper end adapted to engage the top portion of the rod holder, said arcuate member having a lengthwise slot therein, and a second arcuate member having a lengthwise slot therein, fastening means to adjustably secure the first and second arcuate members to each other, and clamp means for securing said second arcuate member to a fixed object.

3,903,634
FISHING ROD SUPPORTING MEANS

Toshiaki Miyamae, 16,2-ban, 2-chome, Nishi-Iwata, Higashi-Osaka, Osaka, Japan

Filed Aug. 30, 1973, Ser. No. 393,061
Claims priority, application Japan, Dec. 14, 1972, 47-143787; Jan. 9, 1973, 48-6012
Int. Cl.[2] A01K 97/10
U.S. Cl. 43—21.2 1 Claim

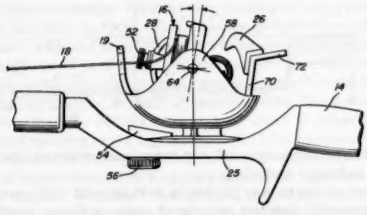


1. A fishing rod supporting means, detachably mounted on a fishing rod, for supporting the rod in a stable manner on a fishing boat in the vertical and lateral directions, said supporting means comprising a bracket having an L-shaped cross-section, a central station fixedly mounted intermediate said bracket and provided in the middle portion thereof with a downwardly curved recessed portion and a pair of blind holes bored at both sides of said recessed portion, a pair of stud bolts fixedly inserted in said holes in vertical relation to said central station, a plate having an upwardly curved portion and a pair of through holes bored in positions corresponding to said blind holes so as to permit such stud bolts to pass therethrough, tightening means screwable to each of said stud bolts for adjustably mounting the fishing rod between said downwardly curved recessed portion of the central station and the upwardly curved portion of the plate, said plate having the upwardly curved portion formed in a substantially inverted V-shape, said middle portion of said central station being elevated above said bracket so as to receive therein a guide pin for guiding a fishing line to and from a fishing line reel mounted on the fishing rod.

3,903,635
CONVERTIBLE FISHING REEL

Harold L. Boese, Galveston, Tex., assignor to H & B Enterprises, Inc., Houston, Tex.

Continuation-in-part of Ser. No. 326,397, Jan. 24, 1973, abandoned. This application Feb. 21, 1974, Ser. No. 444,352
Int. Cl. A01k 87/06, 89/00
U.S. Cl. 43—22 6 Claims

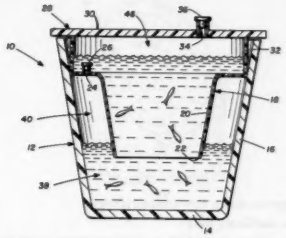


1. The combination of a fishing rod and a line reeling mechanism mounted thereon having a winding spool displaceable between reeling and spin casting positions, the improvement including a frame fixedly secured to the fishing rod, a support body on which the winding spool is rotatably mounted, a drive mechanism carried by the body and operatively connected to the winding spool, means mounting the body in the frame for movement of the winding spool between said reeling and spin casting positions, latch means engageable with said support body for releasably holding the winding spool in the reeling position, and elastically yieldable means supporting the latch means on the frame for limited line leveling displacement of the winding spool relative to the reeling position against a predetermined bias.

3,903,636
OXYGENATION SYSTEM

Jep T. Bracey, 1324 Beckham Ave., Rm. 125, Tyler, Tex. 75701

Continuation of Ser. No. 202,839, Nov. 29, 1971, abandoned. This application Aug. 2, 1973, Ser. No. 385,056
Int. Cl.[2] A01K 97/04
U.S. Cl. 43—56 10 Claims

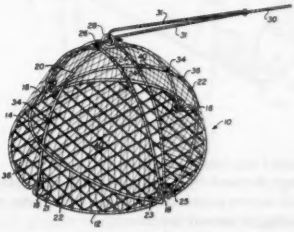


1. A method of increasing the concentration of oxygen in a body of water comprising providing a quantity of oxygen in an open-bottomed container positioned within and substantially below the top of a container which is filled with water to such a depth that the surface of the water is located above the top of the open-bottomed container and thereby maintaining an oxygen-water interface at a point substantially below the surface of the water; and further characterized by positioning a second open-bottomed container on top of the water-filled container while simultaneously exhausting the air therefrom and subsequently receiving a portion of the oxygen from the first open-bottomed container in the second open-bottomed container and thereby maintaining a second oxygen-water interface at the surface of the water.

3,903,637
COLLAPSIBLE TRAP

Lewis Dorsey, Bronx, N.Y., assignor to Robert Alan Dorsey, Scarsdale, N.Y.

Filed Dec. 11, 1974, Ser. No. 531,640
Int. Cl.[2] A01K 69/10
U.S. Cl. 43—105 5 Claims



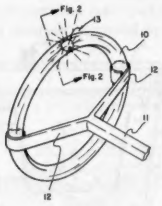
1. Collapsible trap comprising a base, arcuate means extending across the base and pivotably mounted thereon, two frame means each carrying net means extending across said base at generally right angles to the arcuate means and also being pivotably mounted on said base, said arcuate means and said frame means being adapted to lie flat with said base when

the trap is open, said frame means lying flat on opposite sides of the said base, and actuation means adapted to cause the arcuate means to pivot to an upright position and said net and frame means to pivot upwards from said base towards each other over said upright arcuate means and form a trap enclosure with said base.

3,903,638
LIGHT GENERATING TOY

Bogdan Comber, 1540 Mt. Ephraim Ave., Camden, N.J. 08104

Filed June 11, 1973, Ser. No. 368,497
Int. Cl.² A63H *33/36*
U.S. Cl. 46—1 R **7 Claims**



1. A light generating toy comprising:
a dielectric surface; and
a hollow member movable in engagement with the surface and formed of a dielectric material of different dielectric coefficient than the surface;
the hollow member being formed of a transparent material and including an ionizable gas therein whereby movement of the hollow member upon the surface will induce an electrical charge upon the hollow member and ionize the gas with resultant light emission.

3,903,639
ANNULAR WINGED MODEL AIRPLANE

Stephen C. Howell, 1628 Oakland Blvd., Fort Worth, Tex. 76103

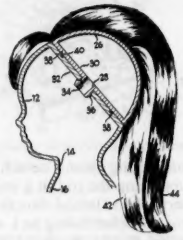
Filed Apr. 8, 1974, Ser. No. 458,889
Int. Cl.² A63H *27/02*
U.S. Cl. 46—78 **8 Claims**

1. A model airplane comprising:
a fuselage formed by a forward frame member and twin spaced booms coupled to said forward frame member and extending rearward therefrom,
a first annular wing coupled to said forward frame member, a second annular wing coupled to the rear ends of said twin booms, and
a model airplane engine, powered by combustible fuel, coupled to the junction of said booms with said forward frame member and extending rearward for driving a propeller,
said engine and propeller being located between said first and second annular wings and spaced longitudinally therefrom.

3,903,640
CHANGEABLE HAIR DOLL

Kathy A. Dunn, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Nov. 7, 1973, Ser. No. 413,669
Int. Cl.² A63H *3/44, 3/12*
U.S. Cl. 46—135 R **6 Claims**

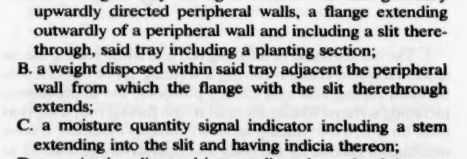


1. For use with dolls or the like, means for changing the appearance of the doll's hair, comprising:
a head including at least one portion thereof movable relative to another portion, one of said head portions being nonmovably mounted on a torso portion of the doll, and the other of said head portions being rotatably mounted on the nonmovable portion and having a generally convex outer contour complementary to said one portion in plural positions relative thereto; and
a plurality of sections of simulated hair of different characteristics on said rotatably mounted head portion for movement therewith to bring the different sections selectively into position to change the appearance of the doll with part of said hair being generally hidden from view when a particular section of hair of desired characteristic is positioned for viewing.

3,903,641
MOISTURE RESPONSIVE TILTING PLANTER

Louis S. Hoffman, Evans Farm Rd., Morristown, N.J. 08057, and Harry Spruyt, 419 E. 91st St., New York, N.Y. 10009

Filed Aug. 31, 1973, Ser. No. 393,447
Int. Cl.² A01G *9/02, 27/00;* **G01D** *13/00*
U.S. Cl. 47—34 **5 Claims**



1. The combination of a planter and moisture quantity signal indicator including:
A. an elongate tray having a bottom wall and generally upwardly directed peripheral walls, a flange extending outwardly of a peripheral wall and including a slit therethrough, said tray including a planting section;
B. a weight disposed within said tray adjacent the peripheral wall from which the flange with the slit therethrough extends;
C. a moisture quantity signal indicator including a stem extending into the slit and having indicia thereon;
D. a projection disposed intermediate the ends of the tray and extending generally downwardly from the bottom

wall of the tray for acting as a fulcrum when the planter is placed on a supporting surface, said projection being positioned relative to the planting section such that the center of gravity of the planter containing soil therein is on the same side of the projection as the weight when the moisture content of the soil is below a certain level, and is on the opposite side of the projection when the moisture content is above said certain level, whereby the planter will be in a first predetermined position when the moisture content is above said certain level and will tilt downwardly on the same side of the projection as said weight when the moisture content drops below said certain level, said indicia on the stem of the moisture quantity signal indicator being disposed below the flange when the planter is in its first predetermined position and being disposed above said flange when said planter tilts downwardly to provide a visible indicator that the moisture content is below said certain level.

3,903,642

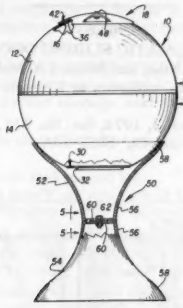
TERRARIUM AND STAND THEREFOR

Bernard Yellin, 5252 S. Kolmar Ave., Chicago, Ill. 60632

Filed Nov. 2, 1973, Ser. No. 412,172

Int. Cl.² A01G *9/02;* **A47G** *7/02;* **B65D** *25/54;* **F16M** *11/00*

U.S. Cl. 47—34 **4 Claims**



1. A terrarium formed of components that may be packaged and shipped in a knock-down disassembled condition and readily assembled by the user, said components including a pair of separately formed semi-spherical shaped members comprising an upper semi-spherical shaped member and a lower semi-spherical shaped member, each said semi-spherical shaped member molded of plastic material in the same first mold cavity, each having interfitting rims whereby the two semi-spherical shaped members are positioned and joined one above the other to form a single hollow globular bowl-shaped member, with said interfitting rims extending within the exterior surfaces of said semi-spherical shaped members so that the two semi-spherical shaped members when joined form a continuous exterior surface at their juncture which does not extend outwardly of said surface, said upper member having a central opening at the top thereof, said lower semi-spherical shaped member having a horizontal planar wall at the bottom thereof, said components including a stand for supporting said single hollow globular bowl-shaped member, said stand formed of a pair of identical but separately formed bell-shaped hollow sections each molded of plastic material in the same second mold cavity and each having an outer annular edge at one end with a cross wall at the opposite end, one of said bell-shaped sections being above and inverted with respect to the other, said bell-shaped sections being secured together at said cross walls, by fastening means, the lower walls of said lower spherical-shaped member seated within the upper one of said bell-shaped hollow sections without being fastened thereto, with the globular wall surface engaging the wall surface of said upper bell-shaped section immediately adjacent the outer annular edge thereof, with said horizontal planar wall positioned within said upper bell-shaped section and below the annular outer edge of said upper bell-shaped section.

3,903,643

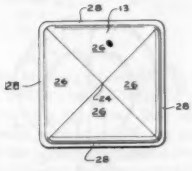
GERMINATING TRAY

Fred N. Blackmore; Fred N. Blackmore, Jr., and John R. Trachet, all of 2412 Yost Ave., Ann Arbor, Mich. 48104

Division of Ser. No. 397,788, Sept. 17, 1973, Pat. No. 3,820,480, which is a division of Ser. No. 245,376, April 19, 1972, Pat. No. 3,799,078. This application Mar. 22, 1974, Ser. No. 453,691

Int. Cl.² A01G *9/10*

U.S. Cl. 47—34.13 **2 Claims**



1. In apparatus for transplanting plants, a germinating tray formed of resilient plastic material and having a plurality of compartments, each of said compartments having side walls and a bottom, said compartments being adapted for containing discrete soil segments in each of which a plant can grow, said bottom in at least some of said compartments having X-shape cuts therein dividing said bottom into four triangular shaped portions which can hinge downwardly and outwardly to positions forming downward extensions of said side walls to allow the soil segment therein to move downwardly out of said tray.

3,903,644

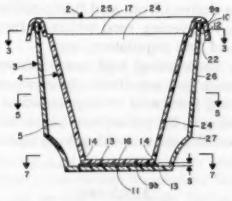
SELF-WATERING PLANTER AND METHOD OF MAKING SAME

June H. Swift, P.O. Box 28012, and John A. Swift, 2740 Mayhew St., both of Dallas, Tex. 75228

Filed May 21, 1973, Ser. No. 362,535

Int. Cl.² A01G *27/00;* **B29C** *17/08;* **G01D** *21/00*

U.S. Cl. 47—38 **3 Claims**



1. A plastic, vacuum operated, automatically controlled, self-watering planter structure, comprising:

a. an inner plastic shell of a particular height having a square bottom and a U-shaped channel and defining a water fill opening,

b. an outer plastic shell of identical height and having a square bottom larger than the inner shell and a free open end and defining a water level indicator opening,

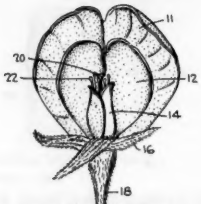
c. a ribbon of plastic base glue joining the top of said outer shell to said inner shell in said U-shaped channel,

d. a layer of plastic base glue joining the outer bottom of said inner shell to the inner bottom of said outer shell,
e. said inner shell defining openings of approximately 0.010 – 0.020 inch in diameter in at least three corners near said square bottom,
f. a water fill opening plug in vacuum-tight engagement with said water fill opening, and
g. a water level indicator plug of translucent material in vacuum-tight engagement with said water level indicator opening.

3,903,645
HYBRID SOYBEAN PRODUCTION

Norman R. Bradner, Storm Lake, Iowa, assignor to Pfizer Inc., New York, N.Y.

Filed Mar. 29, 1974, Ser. No. 456,314
Int. Cl.[2] A01H *1/02*
U.S. Cl. 47—58 **21 Claims**



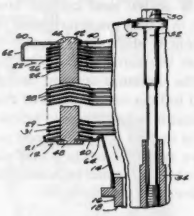
1. A process for the efficient production of seed capable of growing F_1 hybrid soybean plants comprising:
a. growing a first substantially uniform population of soybean plants having an exposed floral stigma and the propensity to yield seed of a relatively small size upon self-pollination in pollinating proximity to a second substantially uniform population of soybean plants which have the propensity to yield seed of a relatively larger size upon self-pollination with said soybean plants of said first population being inherently capable of undergoing both cross-pollination and self-pollination and forming seed upon cross-pollination with pollen derived from said plants of said second population which generally is larger than seed formed upon self-pollination.
b. randomly cross-pollinating said plants of said first population with pollen derived from said plants of said second population with the aid of pollen carrying insects and randomly self-pollinating plants of said first population with pollen derived from said first population,
c. selectively recovering seed which is formed upon said plants of said first population, and
d. physically segregating said seed recovered from said plants of said first population wherein relatively larger seed resulting from said cross-pollination which is capable of growing F_1 hybrid soybean plants is separated from relatively smaller seed resulting from said self-pollination.

3,903,646
FLAME ARRESTOR

Raymond F. Norton, Waukegan, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed June 8, 1973, Ser. No. 368,462
Int. Cl.[2] F17D *3/00*
U.S. Cl. 48—192 **7 Claims**

1. A flame arrestor for an internal combustion engine including an air intake, said arrestor including an assembly of a plurality of vertically spaced fin elements forming an annular stacked array having a top, each of said fin elements having an outermost edge and an outer portion which inclines radially downwardly towards said outermost edge, said fin element at the bottom of said array including an inner edge, a base having a barrel section adapted to be received by the engine air intake, an annular ledge extending radially outwardly from said barrel section for receiving said fin element assembly, and a continuous, annular raised portion which is integral with said

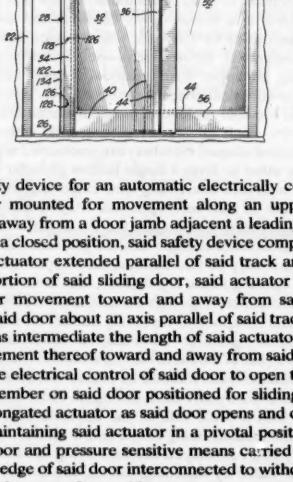


ledge and is located generally adjacent to said inner edge so as to act as a barrier against water draining from said ledge into the engine air intake, and a generally horizontal cover overlying said top of said fin element assembly and terminating in an outer edge portion which extends radially beyond the outermost edges of said fin elements and said ledge.

3,903,647
AUTOMATIC SLIDING DOOR

S. Eugene Hubbard, Niles, and Richard A. Meisterheim, Dowagiac, both of Mich., assignors to Kawneer Company, Inc., Niles, Mich.

Filed Oct. 3, 1974, Ser. No. 511,680
Int. Cl.[2] E05F *15/14*
U.S. Cl. 49—27 **8 Claims**

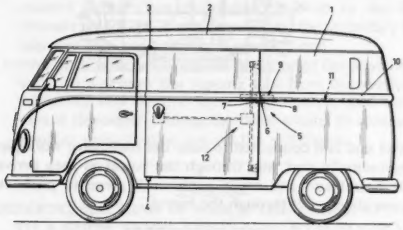


1. A safety device for an automatic electrically controlled sliding door mounted for movement along an upper track toward and away from a door jamb adjacent a leading edge of said door in a closed position, said safety device comprising an elongated actuator extended parallel of said track and facing an upper portion of said sliding door, said actuator pivotally mounted for movement toward and away from said upper portion of said door about an axis parallel of said track, safety switch means intermediate the length of said actuator responsive to movement thereof toward and away from said door for actuating the electrical control of said door to open the same, a contact member on said door positioned for sliding contact with said elongated actuator as said door opens and closes for normally maintaining said actuator in a pivotal position away from said door and pressure sensitive means carried adjacent said leading edge of said door interconnected to withdraw said contact member away from said actuator upon engagement of said pressure sensitive means with an obstruction during closing of said door.

3,903,648
GUIDE MECHANISM FOR SLIDING DOORS FOR MOTOR VEHICLES

Ernst Maneck, Tappenbeck, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed June 5, 1974, Ser. No. 476,453
Claims priority, application Germany, June 22, 1973, 2331843
Int. Cl.² E05D *15/10*
U.S. Cl. 49—215 **7 Claims**



1. Guide mechanism for a sliding door capable of being swung out of an opening in and within a plane parallel to a wall of a vehicle, said mechanism comprising:

a. a hinged armature having a U-shaped frame and having a first and second leg;

b. said first leg being swingably secured to said sliding door;

c. a roller carriage, said second leg being swingable secured to said roller carriage, said roller carriage having a roller;

d. a rail fixed to the vehicle for permitting said roller to roll thereover;

e. a nose fixed to said second leg;

f. a two-armed lever, one arm of said lever forming a pawl element;

g. locking block associated with the other arm of said lever and within the range of the end of said rail when said sliding door is closed, said nose being disengaged from said pawl element when said sliding door is closed;

h. means for arresting the motion of said roller carriage on said rail when said door is closed;

i. said roller carriage being formed of a synthetic material element surrounding substantially three sides of said rail, said synthetic material element forming a bearing for the axle of said roller, whereby said axle is isolated from other metal parts of said hinged armature, the axle of said two-armed lever extending in an approximately horizontal direction and being journalled in said synthetic material element; and

k. means pivoting said two-armed lever for pivotal movement under the influence of gravity and in a vertical plane so that said lever tends under said influence of gravity to swing behind said nose to prevent swingingback of said U-shaped frame.

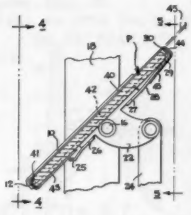
3,903,649
LOUVER SECURITY CLIP

Salvatore A. Dalia, 4583 W. 138th St., Hawthorne, Calif. 90250

Filed Oct. 29, 1974, Ser. No. 518,502
Int. Cl.² E06B *7/08*
U.S. Cl. 49—403 **2 Claims**

1. A security clip for use with a generally rectangular, flat-faced louver panel when such panel is disposed in a jalousie opening by means of a pair of end brackets each positioned to engage opposite faces of the panel along the respective end margin thereof

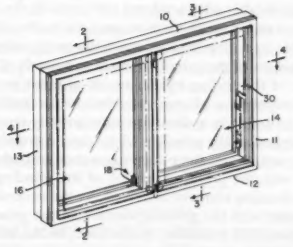
said clip comprising an elongated, generally flat strip having a greater length then the height of said panel, with a generally perpendicular abutment flange upstanding along one longitudinal edge of the strip in position for abutment with an end of the panel adjacent thereto, a segment of the strip extending below the lower end of the abutment flange and forming an open-top generally U-shape channel adapted for reception of the lower edge of the panel therein, and the opposite, top end of the strip beyond said abutment flange being formed by a longitudinally extending segment which may be bent inward over the top edge of the channel-retained panel and thence downward overlying the inner face of the end margin thereof, whereby such clip-carrying panel when snugly lodged within the corresponding end bracket by such clip disposed therebetween, is retained against displacement from the particular end bracket.



3,903,650
NATURAL WOOD GLIDING WINDOW

Ernest L. Anderson, Bellevue, Wash., assignor to Nanco Corporation, Bellevue, Wash.

Filed June 24, 1971, Ser. No. 156,321
Int. Cl.² E06B *7/14*
U.S. Cl. 49—408 **8 Claims**



1. A wooden window having a fixed lite and a sliding ventilator each having a vertical interlocking member, interconnected jambs, sill and head for receiving the fixed lite and sliding ventilator, said head having an elongated horizontal downwardly facing opening for slidably receiving the ventilator, said sill having a cut-out defined by spaced upwardly diverging surfaces, glide means secured to the underside of said ventilator and having downwardly facing slide surfaces supported on said cut-out diverging surfaces whereby contraction of said cut-out diverging surfaces will slide the ventilator upwardly to prevent binding between the ventilator and the sill, and means for removing moisture from between said downwardly facing slide surfaces and said cut-out diverging surfaces, said cut-out diverging surfaces including spaced concave surfaces, said cut-out including en elongated notch intersecting said concave surfaces, said support surfaces of said glide means spanning said notch, and said moisture removing means including drain bores intersecting said notch and terminating below and to the exterior of said sill.

3,903,651
GRINDING MACHINE

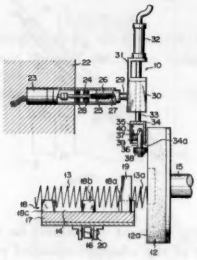
Shigekazu Suzuki, Yokohama; Masaharu Shibata, Kamakura, and Hirotake Kishi, Iwate, all of Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

Filed Oct. 21, 1974, Ser. No. 516,661

Claims priority, application Japan, Oct. 25, 1973, 48-123866 [U]; Oct. 25, 1973, 48-123867[U]

Int. Cl.² B24B *53/02, 49/18*

U.S. Cl. 51—5 D **5 Claims**



1. A grinding machine comprising a machine frame, carrier means for moving workpieces such as coil springs, while holding them in a direction transverse to the longitudinal direction of a passageway, driving means for driving the carrier means, and a grinding wheel rotatably mounted on one side of the passageway and having a grinding surface substantially perpendicular to an axis of the workpiece, said grinding wheel being movable in the direction transverse to the longitudinal direction of the passageway so as to vary a grinding depth, said grinding machine further including a reversible motor mounted on the machine frame, a cylindrical casing, a threaded rod disposed within the cylindrical casing and rotatably driven by the motor, a sliding block having an internal thread into which the threaded rod is screwed, said sliding block being slidably advanced and retracted by the rotation of the threaded rod, a block member secured to the sliding block and movable in a direction substantially perpendicular to the grinding surface of the grinding wheel as a result of the sliding movement of the sliding block, an air cylinder supported by the block member, a plunger member reciprocably movable by the air cylinder in a direction substantially parallel to the grinding surface of the grinding wheel, and a dressing element coupled to one end of the plunger member and adapted to be contacted with the grinding surface of the grinding wheel, in which the dressing element is moved, by the reversible motor, into abutment with the grinding surface of the grinding wheel and is reciprocably movable, by the air cylinder, on the grinding surface of the grinding wheel substantially radially thereof.

3,903,652
CONTINUOUS CLEANING APPARATUS

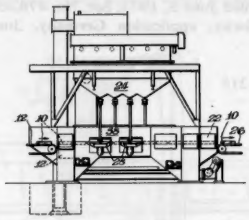
Davis L. Baughman, and James H. Carpenter, Jr., both of Hagerstown, Md., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed May 26, 1966, Ser. No. 553,183

Int. Cl. B24c *3/30, 3/14*

U.S. Cl. 51—15 **18 Claims**

1. A continuous treating apparatus for rapidly cleaning a succession of work pieces, said apparatus comprising a barrel of skeletal wall construction open at both ends and having a length that permits the longitudinal passage of a single line of work pieces therethrough, rotating means for rotating said barrel about its longitudinal axis, said barrel being long enough to hold a multiplicity of the work pieces at one time and its walls being shaped to directly engage the work pieces and keep them from rotating with respect to the barrel, abrasive throwing wheel means positioned alongside the barrel for projecting abrasive particles through the skeletal barrel wall at the work pieces in the barrel, endless conveyor structure connected to carry a succession of work pieces from a lateral direction to one end of the barrel, and pusher means at said



barrel end and connected to push the successive work pieces longitudinally part way through the barrel as they arrive at that barrel end and cause each work piece to push other pieces ahead of it through the barrel.

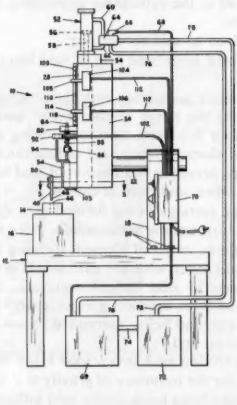
3,903,653
LAPPING MACHINE

Harold J. Imhoff, Stuart, Fla.; Jack H. Bennett, Detroit, and Dennis E. Turpin, Farmington, both of Mich., assignors to Harold J. Imhoff, Stuart, Fla.

Filed Apr. 11, 1973, Ser. No. 349,916

Int. Cl.² B24B *19/00*

U.S. Cl. 51—59 R **19 Claims**



1. A lapping machine for finishing a surface in a workpiece by means of a linearly reciprocating, non-rotating lapping tool comprising:

a frame;

a secondary slide member slidably mounted in the lapping machine for linear reciprocation movement with respect to the frame in a direction toward and away from the workpiece, said secondary slide member including means for mounting the lapping tool thereon such that reciprocation of the secondary slide member brings the lapping tool into abrading engagement with the surface of the workpiece;

drive means mounted on the frame for reciprocating the secondary slide member so as to move the lapping tool into and out of abrading engagement with the surface of the workpiece, said drive means being connected to the secondary slide member by means of a resilient biasing

means, said resilient biasing means urging the lapping tool into engagement with the workpiece in response to movement by the drive means toward the workpiece, said resilient biasing means urging the lapping tool against the surface of the workpiece with a pressure that increases in proportion to the amount of relative movement between the secondary slide member and the drive means when the drive means is moved toward the workpiece;

sensor means for sensing the relative movement of the drive means and secondary slide member in the direction toward the workpiece, said sensor means generating a control signal when the distance moved by the drive means exceeds the distance moved by the secondary slide member by a predetermined amount; and

control means for reversing the direction of the drive means so as to withdraw the lapping tool from the workpiece whenever said control signal is generated, said control means thereafter causing the drive means to commence another reciprocation toward the workpiece.

3,903,654

GRINDING MACHINE IN WHICH THE FORCE APPLIED TO A GUIDE TEMPLATE IS ADVANTAGEOUSLY REDUCED

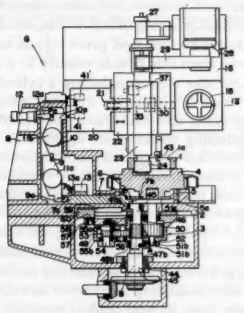
Kunihisa Hayashi, and Yoshihiro Tadera, both of Kure, Japan, assignors to Toyo Kogyo Co., Ltd., Hiroshima, Japan

Filed Oct. 17, 1974, Ser. No. 515,715

Claims priority, application Japan, Oct. 23, 1973, 48-119601

Int. Cl. B24b *5/06*

U.S. Cl. 51—101 R **6 Claims**



1. A grinding machine for abrading a trochoidal form surface of a work piece which comprises a work piece operating table slidably mounted, for securing a work piece thereon, on a surface of a main body of said grinding machine, said work piece operating table being adapted to move so as to form a trochoidal curve on a normal line for said trochoidal curve, a template having a cam face thereof corresponding to said trochoidal form and secured to said work piece operating table at a side of the latter opposite to that on which said work piece is secured, a follower member which is in sliding contact with said cam face of said template and which is slidable to a direction of movement of an abrasive wheel, rotary arm means whose one end is associated with said follower member so as to urge said follower member to said cam face or to space said follower member away from said cam face, means for applying a first pressure to the other end of said rotary arm means in a direction to urge said follower member to said cam face of said template, a head stock supporting a spindle of said abrasive wheel, means for applying a second pressure in a direction opposite to that of said first pressure so as to slide said head stock to a direction toward said other end of said rotary arm means for urging said head stock against said other end of said rotary arm, said follower member being urged against said cam face of said template at a pressure equal to said first pressure minus said second pressure since said second pressure is smaller than said first pressure.

3,903,655

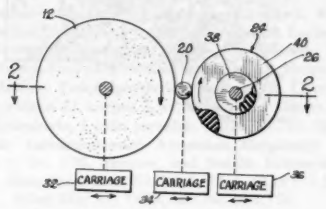
GRINDING MACHINE WITH RESILIENT CONTROL WHEEL

Peter J. Sommer, Elmhurst, Ill., assignor to American Gage & Machine Company, Elgin, Ill.

Filed Dec. 16, 1974, Ser. No. 532,743

Int. Cl.² B24B *5/30*

U.S. Cl. 51—103 R **8 Claims**



1. A grinding machine, comprising

a grinding wheel,

first driving means for rotating said grinding wheel at a relatively high surface speed,

a pair of work piece supports for rotatably supporting a work piece for engagement with said grinding wheel,

a rotatable control wheel for frictionally engaging the work piece to rotate the work piece while it is being ground,

and a second driving means for rotating said control wheel at a relatively low surface speed compared with the surface speed of said grinding wheel,

said control wheel including a generally cylindrical inner core portion made of a relatively soft resilient yieldable rubbery material,

said control wheel including a generally cylindrical ring shaped outer peripheral portion mounted securely around said inner core portion and made of a resilient rubbery material which is substantially harder than the material of said inner core portion,

the softness and resilience of said inner core portion making it possible for the control wheel to adapt itself to variations in the work piece so as to achieve full driving engagement between the work piece and said control wheel.

3,903,656

GRINDING MACHINE FOR GENERATING A SURFACE OF REVOLUTION ON A HOLLOW WORKPIECE

Wolfgang Max Binder, Indianapolis, Ind., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 230,009, Feb. 28, 1972, Pat. No. 3,826,047. This application Mar. 25, 1974, Ser. No. 454,161

Int. Cl. B24b *7/04, 5/04*

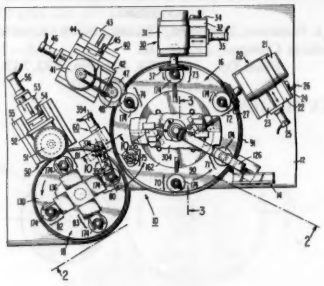
U.S. Cl. 51—108 R **16 Claims**

1. A machine for generating a surface on a hollow workpiece having a predetermined orientation with regard to the mean axis of an irregular inner surface of the workpiece, comprising:

a base,

a workhead mounted on the base and capable of being indexed to a work-station including workpiece support means mounted on said workhead, said workpiece support means including means for orienting the workpiece so that said mean axis intersects a machine axis and means for simultenaously (i) tilting said workpiece so that said mean axis is substantially coincident with said machine axis and (ii) axially displacing said workpiece to a plane normal to said machine axis and defined by three

rigid support members secured to said support means and positioned to abut said inner surface, and



a wheelhead moveably mounted on the base at said workstation including a rotatably mounted spindle having a surface generating wheel secured thereto at said predetermined orientation for generating a surface when said wheel is caused to rotatably contact said workpiece.

3,903,657

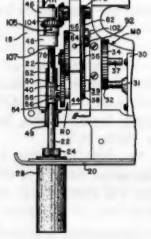
PORTABLE JIG-SAW SPINDLE SANDER

Herbert R. Pfister, Stony Brook, N.Y., assignor to The Black and Decker Manufacturing Company, Towson, Md.

Division of Ser. No. 280,745, Aug. 15, 1972, Pat. No. 3,841,416. This application June 4, 1974, Ser. No. 476,201

Int. Cl.[2] B24B *23/02*

U.S. Cl. 51—170 PT **6 Claims**



1. A portable power tool comprising a housing, a motor in said housing, a shoe plate on said housing adapted to support said tool for movement over a workpiece, a handle on said housing and including control means for said motor, output tool means including a generally cylindrical abrasive element extending through an opening in said shoe plate and in a direction generally perpendicular to the axis of said motor, and means interconnecting said motor and said tool element to cause said tool element to rotate and axially reciprocate along a longitudinal axis thereof.

3,903,658

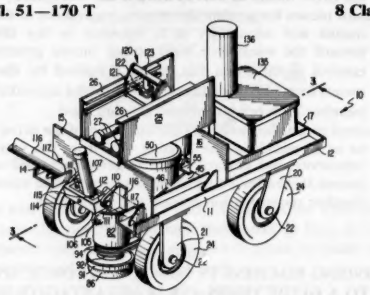
MOBILE OSCILLATING SPOT GRINDER WITH PRESSURE CONTROL MEANS TO PRODUCE A FEATHERING EFFECT

Leo R. Daiuta, Kennett Square, Pa., assignor to Lukens Steel Company, Coatesville, Pa.

Filed Nov. 21, 1974, Ser. No. 525,749

Int. Cl. B24b *23/02*

U.S. Cl. 51—170 T **8 Claims**



1. A swing-type grinder for removing from a horizontal surface defects such as pits, cracks and other minor blemishes the grinder comprising: a grinding wheel; a frame for carrying said grinding wheel; support means for said grinding wheel connected to said frame, said support means including substantially vertically disposed first pivot means and substantially horizontally disposed second pivot means whereby said grinder wheel is adapted to be moved both horizontally and vertically relative to said frame; oscillation producing means connected to said support member whereby said support member with said grinding wheel is adapted to be selectively oscillated relative to said first pivot means and said grinding wheel is moved from side to side relative to a central position; a hydraulic cylinder means including a cylinder, a piston and a piston rod extending from the cylinder interconnected with said grinding wheel and said frame for establishing the force which said grinding wheel bears against the underlying surface, the connection being such that the piston of said hydraulic cylinder means moves therein in response to horizontal movements, said hydraulic means being extended in length as said grinding wheel is oscillated away from its central position; said hydraulic cylinder means being in a closed hydraulic circuit which includes at least one accumulator whereby said force of said grinding wheel against the underlying surface is reduced by said oscillating movement as said grinding wheel is moved away from its said central position.

3,903,659

AIR-SUPPORTED PAVILION

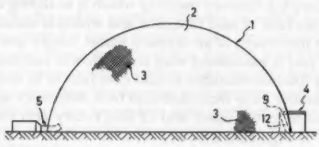
Sigmund Echtler, Buttermelcherstrasse 9, 8 Munich 5, Germany

Claims priority, application Germany, Sept. 10, 1973, 2345529

Filed Sept. 9, 1974, Ser. No. 504,341

Int. Cl.[2] E04B *1/345*

U.S. Cl. 52—2 **7 Claims**



1. An air-supported pavilion comprising, in combination:

a net;

anchoring means to anchor said net to a ground support surface;

an inflatable envelope of substantially air-impermeable sheet material to be urged against said net by pressure of air introduced into the interior of said envelope to maintain said pavilion in an erected state;

passage means defining an entrance-way of predetermined height bounded by two lateral extremities of said passage defining means, edge portions of said envelope being rolled into a bead extending peripherally around said pavilion and being supported in part at said predetermined height by said passage defining means and in part at ground level by said ground support surface; and

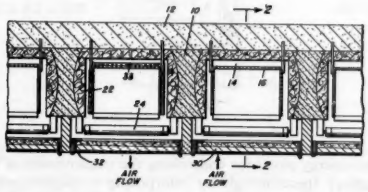
two blocking members each substantially closing a respective one of two gaps defined between each of said two lateral extremities and portions of said bead, which extend intermediate portions thereof supported by said ground support surface and by said passage defining means.

3,903,660

CEILING CONSTRUCTION

Mark M. Akins, 7203 Rollingwood Dr., Chevy Chase, Md. 20015

Filed Sept. 11, 1973, Ser. No. 396,153
Int. Cl.² E04F *17/04*
U.S. Cl. 52—27 **9 Claims**



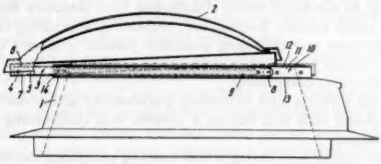
7. An air circulating ceiling construction including a system inlet and exhaust ducts, sound absorbing means provided adjacent said ducts for the muffling of air flow induced noises and for absorbing noises from the room below, and filter panels mounted below said ducts and sound absorbing means and in the path of air flow to and from the room, said filter panels defining the exposed surface of the ceiling and effecting entrapment of airborne dust particles and the like whereby the sound absorbing means is maintained clean and its sound absorbing capability unimpaired, said filter panels being formed of bonded continuous fibers approximately 25 to 40 microns in diameter.

3,903,661

SKYLIGHT ASSEMBLY

Klaus Göbel, Am Forst, 55 Trier, Germany

Filed Apr. 18, 1974, Ser. No. 461,917
Claims priority, application Germany, Apr. 21, 1973, 2320401; Mar. 14, 1974, 2412154
Int. Cl.² E05F *15/20, 1/10*
U.S. Cl. 52—72 **10 Claims**



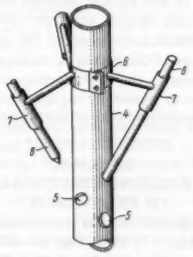
1. A skylight assembly including a roof opening, a supporting cupola sealing such opening and an openable skylight on such cupola comprising means for supporting the skylight on the cupola including a pair of spaced, substantially horizontal, substantially parallel rails, a corresponding end of each rail pivotally connected to the skylight, guideway means including a pair of guideways carried by the cupola adjacent to said rails and means for supporting said rails on said guideways for relative displacement therebetween, means for biasing said rails for substantial horizontal displacement into skylight-opening position, and locking means for locking the skylight in closed position in opposition to said biasing means.

3,903,662

METHOD OF SECURING STRUCTURAL SUPPORT ELEMENTS IN SOIL

Jury Alexandrovich Gabliya, ulitsa Sovetskaya, 8, Moskovskaya oblast, Schelkovo; Lev Emmanuilovich Levin, Nizhnaya Krasnoselskaya ulitsa, 45, kv. 80, Moscow; Evgeny Mikhailovich Bukharin, Kosinskaya ulitsa, 18, korpus 3, kv. 166, Moscow; Fedor Ignatievich Sloevsky, B. Cheremushkinskaya ulitsa 32, korpus 2, kv. 4, Moscow; Abram Borisovich Rubinshtein, Lyalin pereulok, 24/26, kv. 46, Moscow; Vladimir Ambartsumovich Avanesian, Gospitalny val, 3, korpus 6, kv. 170, Moscow, and Indulis Krishevich Birzeniek, ulitsa Ezermalas, 59, kv. 1, Riga, all of U.S.S.R.

Filed May 17, 1973, Ser. No. 361,154
Int. Cl.² E04G *21/14;* **E02D** *5/74*
U.S. Cl. 52—742 **1 Claim**



1. A method of securing a structural support element in the soil, said method comprising forming the structural support element as a post, forming a plurality of inclined holes in one end of the post whose axes intersect, sinking said one end of said post in the soil such that said openings are below ground level, rigidly and detachably securing to said post above the level of the ground a cup having guides inclined to intersect said holes upon extension towards the soil, introducing wedges into said guides, driving said wedges into the soil so that the wedges enter said holes in the post and subsequently sink deeper into the soil, and removing said cup after the post has been secured by means of the wedges.

3,903,663

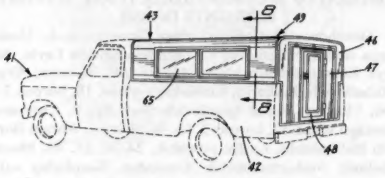
PICK-UP COVER

Huston K. Bainter, and Marvin E. Nerem, both of Forest City, Iowa, assignors to Winnebago Industries, Inc., Forest City, Iowa

Division of Ser. No. 15,602, March 2, 1970, abandoned, which is a continuation-in-part of Ser. No. 777,934, Sept. 9, 1968, abandoned. This application June 3, 1971, Ser. No. 149,747
Int. Cl.² E04H *1/12;* **F04C** *2/24*
U.S. Cl. 52—79 **6 Claims**

1. A multi-sided cover adapted to be mounted on the body of a truck comprising: spaced generally upright end walls, a sandwich construction panel mounted on the end walls, said panel having generally upright side wall sections, a generally horizontal roof section, and longitudinally extended transverse curved corner sections joining the side wall sections with the opposite sides of the roof section, said panel being a one-

piece member having a one-piece pliable outer facing, a plurality of spaced inner rigid facings, rigid longitudinal rail means extended between the outer edge portions of the inner and outer facings of the side wall sections adapted to be connected to a body of a truck, an expanded compressible plastic foam core, said core being continuous and having a substantially uniform thickness and extending between the rail means, bonding means securing the entire outer facing to one side of the core, securing the inner facings to the opposite side of the core, and securing the rail means to the outer facing and inner facing of the side wall sections, said inner rigid facings being



separated from each other longitudinally along the corner sections, said pliable outer facing and core of the corner sections having longitudinally extended transverse curved portions, said core of the corner sections being compressed and bonded to the curved portions of the pliable facing, the compressed core of the corner sections having longitudinal continuous transverse curved surfaces, cover means having curved surfaces which correspond to the curved surfaces of the compressed core of the corner sections, and means attaching the cover means to the inner facings to hold the curved surfaces of the cover means in engagement with the curved surfaces of the compressed core of the corner sections. facings

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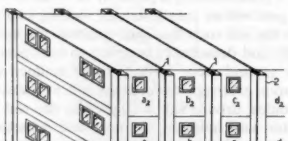
3,903,664

MODULE UNIT BUILDING STRUCTURE AND METHOD OF ERECTING IT

Joseph Doriel, 32 Remez St., Tel Aviv, Israel

Filed Oct. 17, 1973, Ser. No. 407,245
Claims priority, application Israel, Oct. 25, 1972, 40658
Int. Cl.[2] E04H *1/04*
U.S. Cl. 52—79 **4 Claims**



1. A prefabricated boxlike module unit containing a plurality of modules, each module comprising:

a floor member;

two pairs of vertically extending rectangular wall members, each wall member having four corners, each pair of wall members affixed to opposite sides of said floor member forming a hollow parallelepiped;

a plurality of vertically extending flanges, each of said flanges extending outwardly from a corner of a said wall member parallel to said floor member so that each of said flanges lies in close proximity to an adjacent flange thereby forming neighboring flanges;

a slidably movable vertically extending rectangular channel member having walls enclosing vertically aligned neighboring flanges; and

a plurality of cross bars extending inwardly from one of the walls of said channel member to another wall of said channel member;

whereby said channel member, flanges, and cross bars form a solid reinforcement for a concrete mixture which is poured into said channel member.

3,903,665

HEAT ENERGY TRANSMISSION CONTROL PANEL

David Carl Harrison, 2726 Monterey St., Albuquerque, N. Mex. 87106

Filed Nov. 28, 1973, Ser. No. 419,589
Int. Cl. E04h *14/00;* **E06b** *7/12*
U.S. Cl. 52—171 **10 Claims**

1. An energy panel for controlling the transmission of thermal energy therethrough by interposing a quantity of dry thermal insulative material in the path of said energy, said panel comprising:

a window member fabricated from a material adapted to transmit at least a portion of incident radiation energy therethrough;

means adjacent said window member defining a chamber a quantity of dry thermal insulative material;

storage means receiving a quantity of dry thermal insulative material sufficient to fill said chamber;

means for transporting said material to said chamber; and means for recirculating said material from said chamber to said storage means, whereby the amount of said energy transmitted through said window member is controlled by the amount of said material located in said chamber.

3,903,666

ACCESS ARRANGEMENT FOR AN ELECTRICAL WIRING DISTRIBUTING FLOOR STRUCTURE

Frank W. Fork, Allison Park, Pa., assignor to H. H. Robertson Company, Pittsburgh, Pa.

Filed Oct. 21, 1974, Ser. No. 516,669
Int. Cl.[2] H02G *3/04;* **E04F** *19/08*
U.S. Cl. 52—221 **14 Claims**

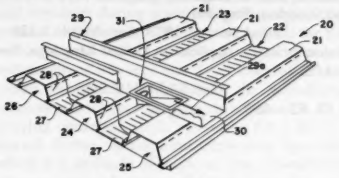
1. In an electrical wiring distributing floor structure including a metal cellular flooring unit presenting alternating crests and troughs and providing generally parallel enclosed cells, each trough including a valley and confronting webs; the improvement comprising:

a cell forming unit extending transversely across said enclosed cells and having a bottom wall confronting said crests;

said bottom wall having a wall opening presented above one trough which is disposed between adjacent first and second cells;

a web access opening in that web of the first cell which is presented within said one trough; and

enclosure means for isolating a trough portion of said one trough which includes said web access opening and at



least a portion of said wall opening, thereby to establish communication between the interior of the first cell and that of said cell forming unit.

3,903,667

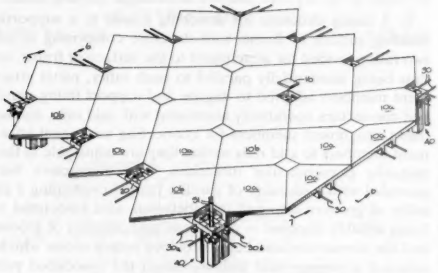
STRUCTURAL FLOOR SYSTEM ACCOMODATING MULTI-DIRECTIONAL DUCTS

Lev Zetlin, Roslyn, N.Y., assignor to Lev Zetlin Associates, Inc., New York, N.Y.

Continuation of Ser. No. 371,050, June 18, 1973, abandoned. This application July 12, 1974, Ser. No. 487,981

Int. Cl.² E04C *3/10, 3/22*

U.S. Cl. 52—227 **20 Claims**



1. In a floor structure, in combination:

a pair of longitudinal and a pair of transverse reinforced concrete beams, each having a horizontal flange portion and a pair of spaced parallel stem portions depending from said flange portion and defining between themselves an axial channel open at opposite ends;

a horizontally disposed rectangular yoke means having a first pairr of spaced parallel longitudinal side portions and a second pair of spaced parallel transverse side portions defining between themselves an opening;

each of said beams having a first end portion adjacent said yoke means and a second end portion spaced from said yoke means, sa.d stem portions of said longitudinal beams being in substantial alignment with the respective ones of said longitudinal side portions of said yoke means, and said stem portions of said transverse beams being in substantial alignment with the respective ones of said transverse side portions of said yoke means;

a first pair of tension means extending in lengthwise direction through said respective stem portions of said longitudinal beams and said longitudinal side portions of said yoke means for integrally connecting together said pair of longitudinal beams with said yoke means and a second pair of tension means extending in lengthwise direction through said respective stem portions of said transverse beams and said aligned transverse side portions of said yoke means for integrally connecting together said pair of transverse beams with said yoke means whereby the entire structure is integrally connected together;

said yoke means spanning the distance between the stem portions of each of said beams and having a depth sufficiently smaller than the depth of the channels in said beams so as to leave uncovered a substantial portion of the open ends of said channels whereby said open ends are adapted to accommodate a duct extending therethrough.

3,903,668

STRUCTURAL UNIT BODY AND A STRUCTURE ASSEMBLED OF THE UNIT BODIES

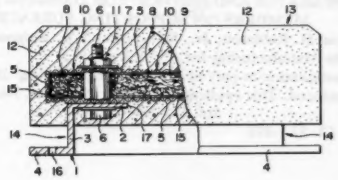
Naomitsu Megumi, Funabashi, Japan, assignor to Naomitsu Megumi, Funabashi and Tokyo Plywood Kabushiki Kaisha, Tokyo, both of, Japan

Filed Nov. 5, 1973, Ser. No. 413,052

Claims priority, application Japan, Nov. 17, 1972, 47-115432; Dec. 7, 1972, 47-122689

Int. Cl.² E04B *2/58, 1/76, 1/04*

U.S. Cl. 52—405 **7 Claims**



1. A prefabricated structural unit body adapted to be affixed to a structural member comprising a four sided frame with each side having a frame plate along with an outer flange and an inner flange, said outer flange extending outwardly and said inner flange extending inwardly from said frame plate, said inner flange circumscribing an opening in said frame, a stuffing box, a noncombustible material within said stuffing box, anchoring means securing said stuffing box to said inner flange to thereby close said opening, cement mortar disposed on at least portions of said stuffing box and said frame, said cement mortar being disposed relative to said outer flange so as to form a circumferential groove between said cement mortar and said outer flange, whereby said groove provides access to said outer flange to facilitate affixing the latter to said structural member.

3,903,669

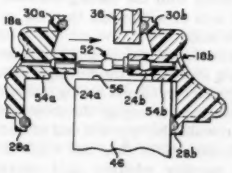
MOUNTING ASSEMBLY

David H. Pease, Jr., Cincinnati, and William M. Bursk, Middletown, both of Ohio, assignors to Pease Company, Fairfield, Ohio

Filed Feb. 19, 1974, Ser. No. 443,818

Int. Cl.² E06B *3/58*

U.S. Cl. 52—455 **16 Claims**



1. A mounting assembly for supporting a flat pane of glass or the like in a receiving opening in a frame, comprising:

a. a pair of complementary molding members of plastic material each including

i. an intermediate portion sized to be received within said opening,

ii. an outer rim sized to seat on an annular surface area of said frame surrounding said opening, and

iii. an inner rim sized to seat on an annular surface area of said pane adjacent the periphery thereof,

b. said intermediate portion of each of said molding members including spaced female connector studs each having a bore therein and located for alignment with opposed studs on the other complementary molding member, and

c. complementary male connector members having a pilot portion of lesser diameter than the diameter of said bore in the associated said stud and having a spherically curved locking portion of greater diameter than said diameter of said bore in said associated stud for force-fitting engagement therein whereby said molding members are releasably yet positively held together with said rims in clamping relation with said annular surface areas of said frame and said annular surface areas of said pane.

3,903,670

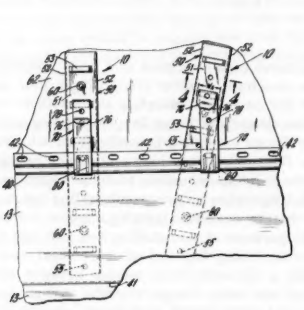
APPARATUS AND METHOD FOR HANGING SIDING MEMBERS ON SUPPORTING SURFACES

Arthur H. Robinson, Jr., Somerville, N.J., assignor to Mak-Rite Manufacturing Inc., Middlesex, N.J.

Continuation-in-part of Ser. No. 389,567, Aug. 20, 1973, abandoned. This application May 6, 1974, Ser. No. 466,964

Int. Cl.[2] E04C *2/38*

U.S. Cl. 52—478 **6 Claims**



1. An apparatus for hanging an elongated siding member on a support surface in combination with a siding member, said siding member including an elongated projecting edge, which apparatus comprises:

a plurality of elongated furring members secured to said support surface, each furring member having integrally formed therewith a plurality of projecting rims spaced along the length of said furring member, each projecting rim defining with the furring member first and second parallel slots of widths less than the width of the furring member; and

a plurality of flexible hanging clips for movably connecting the siding member to the furring members, each flexible clip being elongated and having one end thereof of generally hook-shape to engage the projecting rim of the siding member, while the opposite end of said clip is of substantially smaller width than the width of the slots of said furring member whereby said opposite end may be readily inserted through the first slot of a projecting rim to the back of the projecting rim and thence through the second slot thereof, after which said opposite end of the clip is reversibly bent about itself to secure said siding member to said support structure.

3,903,671

WALL LININGS

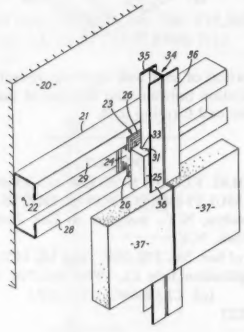
David Ernest Cuin, Radcliffe on Trent, and Alan Shaw, South Wilford, both of England, assignors to BPB Industries Limited, London, England

Filed Nov. 6, 1973, Ser. No. 413,328

Claims priority, application United Kingdom, Nov. 7, 1972, 51361/72

Int. Cl.[2] E04B *2/88*

U.S. Cl. 52—480 **7 Claims**



1. A lining structure for attaching panels to a supporting building surface or frame, said structure comprising at least two rails provided for attachment to the surface or frame, said rails being substantially parallel to each other, panel attachment members adapted to engage and support lining panels, and connectors operatively associated with said rails, and said panel attachment members for connecting said panel attachment members to said rails so that they are adjustable in three mutually perpendicular directions, said connectors being provided with a plurality of parallel flanges containing a plurality of grooves disposed therebetween, said associated rail being slidably disposed in any one of said plurality of grooves, and the connectors also being provided with a recess which is adapted to engage and slidably retain the associated panel attachment member, said panel attachment member extending in a direction at right angles to the rails.

3,903,672

METHOD AND MACHINE FOR FILLED BAG PRODUCTION

Lugiti Goglio, Via Solari 10, Milan, Italy

Filed Nov. 15, 1973, Ser. No. 416,273

Claims priority, application Italy, Nov. 23, 1972, 32002/72

Int. Cl. B65b *1/02*

U.S. Cl. 53—24 **12 Claims**

1. In a method for making and filling bags, the steps of manufacturing a series of bags from a strip of sheet material while conveying the thus-manufactured bags with a first con-

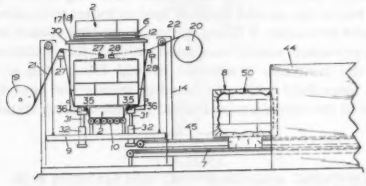
veyer during a first conveying operation at least during the last stage of manufacture of the bags in a stepwise manner according to which predetermined advance and dwell intervals alternate with each other, conveying the thus-manufactured bags with a second conveyer during a second conveying operation to a filling station, with the conveying of the bags to the filling station also being carried out in a stepwise manner according to which predetermined advance and dwell intervals alternate with each other, delivering a plurality of the manufactured bags to said second conveyer at each dwell interval of said second conveying operation while providing for a dwell and advance interval during said second conveying operation a total time which is a multiple of the total time provided for a dwell and advance interval during said first conveying operation, and simultaneously filling each plurality of bags delivered to said second conveyer during a dwell interval of said second conveying operation, so that each bag may be filled during an interval substantially longer than the dwell interval of the first conveying operation to gain additional filling time without retarding the rate of manufacture of the bags.

3,903,673

MACHINE FOR PRODUCING A LOAD OF GOODS COMPRISING A PLURALITY OF LAYERS

Halvor Grasvoll, Stigbergsliden, Sweden, assignor to Aktiebolaget Platmanufaktur, Malmo, Sweden

Filed Feb. 8, 1973, Ser. No. 330,753
Claims priority, application Sweden, Feb. 11, 1972, 1690/72
Int. Cl.[2] B65B *35/50, 11/26*
U.S. Cl. 53—162 **4 Claims**



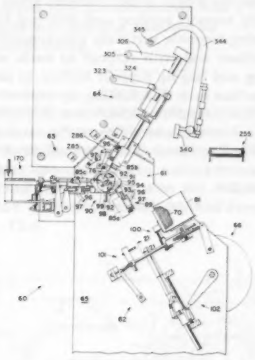
1. A machine comprising a stand, a support vertically displaceable in said machine stand, a conveyor, a feeder means arranged to receive goods in layers from said conveyor, transfer of goods from said conveyor onto said feeder beginning when said support is in its uppermost position, a stripper means for transferring each individual layer of goods from said feeder means onto said support or onto a layer or layers of goods previously deposited on said support, respectively, upon movement of said feeder in a direction away from said stripper means, and a first device for discharging two first webs of plastics film in a direction towards one another for enclosing said load comprising superposed layers of goods, whereupon said first webs of film are welded together, a second device for discharging in a direction towards one another and at right angles to said first web two second webs of a second plastics film to deposit said second webs intermediate said support and said first plastics film, and a device for welding together said second webs of said second film on top of the film portion of said first plastic film extending on top of the uppermost layer of goods, the improvement comprising means for welding said second webs of said second film to said first plastic film along marginal portions thereof extending outside opposite ends of said bottom layer of goods.

3,903,674

PACKAGING APPARATUS

John Burke Brush, North College Hill, and Leonard Cecil Hooper, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 15, 1974, Ser. No. 461,322
Int. Cl.[2] B65B *5/06, 23/00, 43/30, 43/60*
U.S. Cl. 53—188 **9 Claims**



7. An apparatus for non-gravitationally filling bags having relatively stiff side walls with a metered plurality of frangible articles of uniform non-planar shape, said apparatus comprising:

a bag magazine;

means for removing an unopened bag from said bag magazine;

means for opening said bag so that said bag has a predetermined transverse cross-section of a shape and size sufficient to freely advance said articles into said bag;

means for maintaining said predetermined cross-section while said means for opening is being disassociated from said bag and while said bag is being filled;

means for positioning said bag at a filling orientation which substantially precludes gravity induced filling; and,

means for advancing said metered plurality of articles into said opened bag disposed at said filling orientation so that said bag can be filled with said articles without having to impose any bag opening forces on said articles and without dropping said articles.

3,903,675

BAGGING APPARATUS

William W. Plumb, Corpus Christi, Tex., assignor to Clayton Specialties, Inc., Corpus Christi, Tex.

Filed Nov. 21, 1974, Ser. No. 525,912
Int. Cl.[2] B65B *43/36*
U.S. Cl. 53—189 **12 Claims**

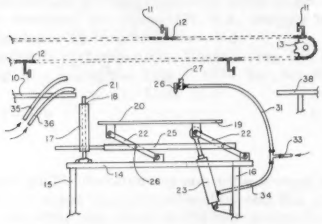
1. A bagging apparatus for use with bags each having a mouth with a lower lip extending beyond the upper lip, the thickness of the main body portion of each bag in a collapsed state being at least twice that of the extended lower lip thereof, which apparatus comprises:

a. a horizontally disposed unit supply surface over which units to be bagged are moved downstream to the bagging area;

b. a substantially horizontal receiving surface for receiving bagged units which is at substantially the same level as said unit supply surface means;

c. a split-level, bag support means for holding a stack of bags with their length in a generally horizontal position,

said bag support means being located downstream of and immediately adjacent to said unit supply surface and upstream of said receiving surface means, the upper surface of said bag support means having a horizontally disposed upstream bag lip support surface adapted to firmly hold and support the extended lower lip portions of a said stack of bags and a horizontally disposed downstream bag body support surface which is adapted to support the main body of a said stack of bags, the length of said bag lip support surface being not substantially greater than the length of the extended lower lip of a bag, said bag lip support surface and said bag body support surface being movable vertically with respect to said unit supply surface and with respect to each other, means connecting said bag lip support surface to said bag body support surface such that said bag lip support surface and said bag body support surface are at substantially the same level when substantially at the level of said unit supply surface and such that a vertical movement of said bag lip support surface results in a vertical movement in a like direction but of a greater magnitude of said bag body support surface, the magnitude of vertical move-



ment of said bag body support surface bearing to the magnitude of vertical movement of said bag body support surface in the same ratio that the thickness of the thickest section of the main body portion of a bag, in a collapsed state and excluding any gusset at the lower end thereof, bears to the thickness of the extended lower lip of a bag;

d. detecting means for detecting the level of the uppermost nondistended bag of a said stack of bags disposed on said bag support means;

e. means for moving said bag lip support surface and said bag body support surface of said bag support means vertically in response to said detecting means so as to maintain the uppermost nondistended bag of a said stack of bags substantially at the level of said unit supply table;

f. means to distend the mouth of the upper bag of a said stack of bags located on said bag support means so that that upper bag may receive a unit to be bagged;

g. means to move a unit to be bagged downstream over said unit supply surface and generally horizontally into the bag whose mouth is so distended and for continuing movement thereafter in the same general downstream direction to move such bag containing such unit away from said bag support means and onto said receiving surface.

3,903,676

SEPARATING AND DISPENSING MEANS FOR NESTED CONTAINERS

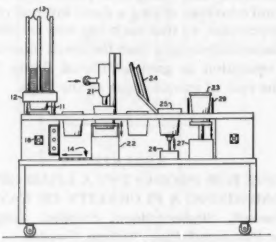
Alfred W. Kinney, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 372,845, June 22, 1973, Pat. No. 3,840,150. This application July 29, 1974, Ser. No. 492,831

Int. Cl. B65b *3/00;* **B65h** *3/28*

U.S. Cl. 53—314 **7 Claims**

1. Apparatus for dispensing frustoconical containers from a stack thereof and filling and capping the dispensed containers, each of said containers having a rolled rim and an outwardly directed stacking shoulder formed in the sidewall of the container a slight distance below the rim thereof; comprising a plurality of feed cylinders, each of said feed cylinders having a groove in the cylindrical surface thereof extending in a generally spiral form from the top of said cylindrical surface to the bottom of said cylindrical surface, each of said feed cylinders having a top cylindrical section which is horizontally adjacent the stacking shoulder of the next to the lowermost container in said stack and a bottom cylindrical section which is horizontally adjacent the stacking shoulder of the lowermost container in said stack, the diameter of said top cylindrical section being greater than the diameter of said bottom cylindrical section; means for positioning said pluraiity of feed cylinders in a circular array which is coaxial with said stack of



containers with the cylindrical axes of said feed cylinders being parallel to the elongated axis of said stack of containers, with each of said plurality of feed cylinders being positioned to simultaneously receive in the groove thereof the rim of a container in said stack; means for simultaneously rotating said feed cylinders to dispense a rimmed container from said stack; a conveyor means having a container receiving station positioned below the circular array of feed cylinders to receive the dispensed container, a filling station, a capping station and a discharge station; means associated with said filling station for filling the container positioned in said filling station; and means associated with said capping station for applying a closure to the container positioned in said capping station.

3,903,677

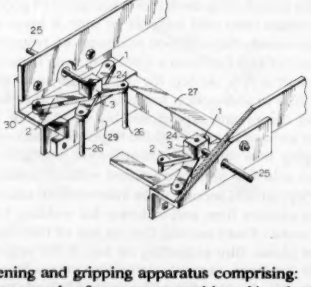
OPENING AND GRIPPING MECHANISM FOR AUTOMATIC PRODUCE-BAGGING MACHINE THAT USES FACTORY-ROLL POLYETHYLENE NET TUBING

Earl K. Bowman, and John C. Teele, both of Gainesville, Fla., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed June 28, 1974, Ser. No. 484,197

Int. Cl.[2] B65B *43/26*

U.S. Cl. 53—384 **7 Claims**



1. An opening and gripping apparatus comprising:

a. a frame secured at four corners positioned in a horizontal plane with parallel non-slip insert gripping surfaces affixed to two inside opposing surfaces, and

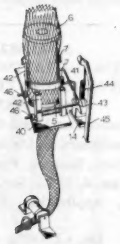
b. located at the forward and aft opposing ends of the frame and adapted to impart movement toward the center of the frame, two crossed, overlapping cross-members, attached in the crossed position just forward of the centerline of said cross-members by a pivot means, to which is attached an extension means which passes through a hole in the frame, said extention means attaching to an actuating means, and the horizontal crossed members have attached to their forward ends at 90° angles, vertical members or rods forming gripping fingers, with the aft end of said horizontal crossed members secured to the upper flat member of the frame by a slide action bushing which is guided along an angular slot in said upper flat member of said frame, and the crossed member lying horizontally across the top of said crossed members also has a spacer between the frame and the top cross member at the secured aft end thereof which imparts horizontal stability and free movement.

3,903,678

SPREADER MANDREL FOR AUTOMATIC PRODUCE-BAGGING MACHINE THAT USES FACTORY-OLL POLYETHYLENE NET TUBING

Earl K. Bowman, and John C. Teele, both of Gainesville, Fla., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed June 28, 1974, Ser. No. 484,199
Int. Cl.² B65B *65/00*
U.S. Cl. 53—393 **5 Claims**



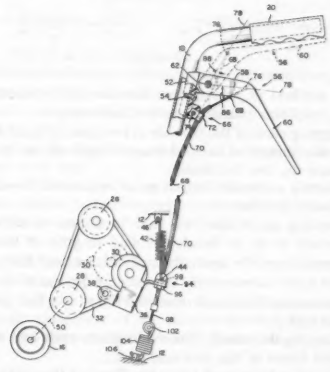
1. A spreader mandrel comprising:
a. a sectional vertical cylinder the bottom section of which telescopes into the top section to allow up and down movement, the bottom section comprising:
1. an outer casing with a hollow center and attached to
2. a lower end tip section with all sharp edges rounded or beveled and a
3. fastening screw
b. a locking and/or releasing device comprising:
1. a locking pin affixed to
2. a locking pin arm mounted on a
3. pivoting pin
4. a locking arm return means and
5. a locking retainer means
c. a top section comprising:
1. an outer casing with a hollow center except for a central member designed substantially in the configuration of a stem, and located on the center-point of the top inner surface of said top section and extending in a downward direction into the center of said hollow center to function in communication with the locking a d/or retaining devices, the bottom end of said central member being beveled to impart laterial motion to the locking pin, and the bottom edge having a groove thus allowing lateral motion for the locking pin to function in a locked position by horizontal entry into said groove;
d. a supporting mechanism comprising:
1. a base plate affixed to
2. a vertical frame designed in two sections with a pivoting means to allow said frame to pivot at the base of the frame sections and the base plate and attached to
3. a stationary guide ring and seat circumambient with respect to the vertical cylinder and attached to a tripper ring and
4. an actuating device for moving said ring on said pivot comprising:
a. a solenoid which communicates with
b. a tripper ring communicating with a
c. tripper arm which is attached to
d. a return spring.

3,903,679

DEAD MAN'S CONTROL FOR LAWN MOWER

Charles E. Sorenson, Mount Vernon; James E. Reynolds, and Arnold A. DeBaillie, both of Evansville, all of Ind., assignors to Hahn, Inc., Evansville, Ind.

Filed May 20, 1974, Ser. No. 471,198
Int. Cl.² A01D *69/08, 55/18*
U.S. Cl. 56—11.6 **2 Claims**



1. An apparatus including a frame, a rotary element mounted upon said frame, wheels supporting said frame for movement upon the ground, a handle secured to said frame for guiding such movement, said handle providing a hand grip, a prime mover mounted upon said frame, and clutch means for drivingly connecting said prime mover to said rotary element, said clutch means including an actuator member movable between a clutch engaging position and a clutch disengaging position, and spring means for yieldably urging said actuator member to its disengaging position, in which the improvement comprises lever means for moving said actuator member to its clutch engaging position, thereby to drive said rotary element by said prime mover, said lever means including a lever having a proximal end portion and a distal end portion, means for mounting said proximal end of said lever on said handle beneath said hand grip for pivotal movement of said distal end portion about an axis toward and away from said hand grip, a control cable connected between said actuator member and said lever so that movement of said distal end portion of said lever toward said hand grip moves said actuator member against the urging of said spring means toward its said clutch engaging position, the proximal end of said control cable being connected to said lever at a first point thereon between said proximal and distal end portions thereof and at a first distance from the pivot axis of said lever, the distal end of said cable being connected to said actuator member, said lever and control cable being positioned and arranged such that a straight line extending between said lever axis and said

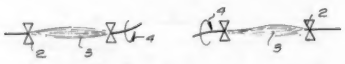
first point is at a first angle with respect to the proximal end portion of said cable when said actuator member is in its clutch disengaging position and at a second and significantly smaller angle slightly greater than zero degrees with respect to said proximal end portion of said cable when said distal end portion of said lever is moved toward said hand grip and said actuator member is in its clutch engaging position, whereby the force necessary to hold said distal end of said lever adjacent said hand grip is significantly less than the force necessary initially to pull the lever toward the hand grip, said lever and cable being positioned and arranged such that the movement of said lever is stopped before the said line between the lever axis and the first point becomes parallel with said proximal end portion of said cable.

3,903,680

METHOD AND APPARATUS FOR SPLICING YARNS AND ROVINGS

Carlos Pujol Isern, Calle Santalo, 148, Barcelona, Spain

Filed Jan. 16, 1974, Ser. No. 433,702
Claims priority, application Spain, Jan. 19, 1973, 410808
Int. Cl.[2] B65H *69/06*; D01H *15/00*
U.S. Cl. 57—22 **14 Claims**



1. A method of joining two threads each consisting of a plurality of fibres twisted together, including

a. gripping each of the threads at two spaced apart locations on the thread so as to define a length of the thread between the two locations,
b. twisting each said length so as to untwist fibres therein from each other,
c. drawing apart the two said locations of each of the threads so as to break the said lengths of thread and thereby provide each thread with an end having fibres which are substantially untwisted from each other,
d. separating from each other the fibres of a first one of the said ends,
e. inserting the other of the said guide ends into the separated fibres of the first said end,
f. separating from each other the fibres of the said other end so that fibres of the two ends are caused to cross each other, and
g. imparting a twisting motion to at least one of the said ends so as to twist the fibres of the two ends together to form a join.

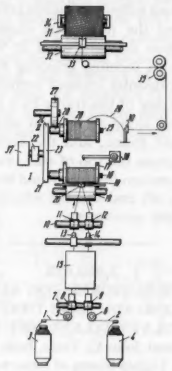
3,903,681

APPARATUS FOR CONNECTING TWO OR MORE WORKING OPERATIONS IN THE PRODUCTION, PREPARATION OR FINISHING OF YARNS

Karl Bous, Sternstr. 74, 56 Wuppertal 2, Germany

Filed June 4, 1973, Ser. No. 366,850
Claims priority, application Germany, June 8, 1972, 2227903
Int. Cl.[2] D01H *1/00*, *9/00*
U.S. Cl. 57—34 R **8 Claims**

1. Apparatus for performing at least two steps in the production of a yarn product, the combination comprising a first yarn winding spindle, a first winding tube seated thereon, a yarn unwinding spindle havir.g a second winding tube seated thereon, said yarn winding and said yarn unwinding spindles and said first and said second winding tubes seated thereon being movable between first positions of use and second positions of use assumed when employed in said two steps; common support means for said winding and said unwinding spindles and tubes seated thereon for alternately moving said spindles between said first and second positions of use without removal of said tubes seated thereon; said yarn winding and said yarn unwinding spindles functioning as yarn winding and yarn unwinding spindles, respectively, in said first positions of use and as yarn unwinding and yarn winding spindles, respectively, in said second positions of use; said winding and unwinding spindles when functioning as winding spindles being employed in the first of said steps, said winding and unwinding spindles when functioning as unwinding spindles being employed in the second of said steps.

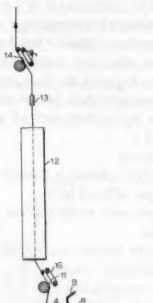


3,903,682

APPARATUS FOR INITIATING OPERATION OF A COMBINED DRAWING AND TEXTURING MACHINE FOR YARN

Henri Crouzet, Renaison, and Jean-Claude Dupeuble, Roanne, both of France, assignors to Ateliers Roannais de Constructions Textiles Societe, Roanne, France

Filed Jan. 4, 1974, Ser. No. 430,791
Claims priority, application France, Jan. 29, 1973, 73.03117
Int. Cl. D02g *1/02*
U.S. Cl. 57—34 HS **8 Claims**



1. An apparatus for drawing and texturing synthetic thermoplastic yarn by false twisting the yarn, wherein the drawing and texturing are performed simultaneously and wherein the apparatus includes means for supplying the synthetic yarn, a heated twist-setting member for setting a twist in the yarn, a heating assembly upstream of the heated twist-setting member, a false twist spindle, a yarn feeder situated downstream of the spindle and means for winding up the resulting textured

yarn; the improvement in which said heating assembly comprises:

a heating element;

a curved bar positioned and configured to partially surround the heating element;

means for mounting the curved bar to pivot about one end so as to overlie said heating element;

means for engaging and deflecting the yarn, disposed in spaced relation on said bar to accommodate the heating element therebetween when said curved bar overlies said heating element to thereby hold the yarn in engagement with said heating element;

arm means connected to said curved bar means at the pivoted edge of said curved bar means, said arm means having means thereon for engaging and deflecting the yarn away from the heating element upon pivoting the curved bar; and

means associated with said curved bar and said arm means for moving said curved bar and said arm means to pivot and carry the yarn into and out of engagement with the heating element.

3,903,683

METHOD FOR SPINNING STAPLES BY MEANS OF THE OPEN-END SYSTEM

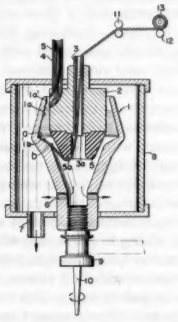
Masakazu Shino, 3-13, Sanwa-cho, Yamatotakada, nara, Japan

Filed Aug. 7, 1973, Ser. No. 386,374

Claims priority, application Japan, Aug. 11, 1972, 47-80503; Aug. 11, 1972, 47-80504

Int. Cl.[2] D01H *1/12*

U.S. Cl. 57—156 **1 Claim**



1. In a method for spinning staples by the open-end system comprising collecting staples sucked from a staple inlet guide tube onto the inner wall of a spinning rotor, twisting said staples while stripping the same, and drawing said staples through a yarn outlet guide tube to a winding device, the improvement comprising: successively sucking a small number of unseparated long staples, fed in the form of a sliver, from a staple inlet guide tube, in the order of arrival from the exit end of said inlet guide tube so as to separate them from one another within the spinning rotor and causing said staples to deposit substantially parallel to each other and to a horizontal plane in the radial direction of the spinning rotor on the circumferential surface of the upper inner wall thereof, the separation of the small number of unseparated long staples being carried out in the narrow clearance between the exit end of the staple inlet guide tube and the upper inner wall by means of the rotating air stream and centrifugal force due to the rotating spinning rotor, causing the deposited staples to slide down toward the maximum diameter portion of the spinning rotor by means of a downward suction force while maintaining said staples parallel, in a gentle spiral as a whole, and thereafter giving said staples collected at the maximum diameter portion a false twist in the region between said portion and the vicinity of the entrance of the yarn outlet guide tube so as to prevent the yarn from breaking.

3,903,684

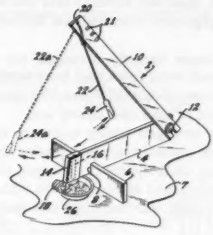
PENDULUM TIMER

Allen Wilson, 5092 Alaska St., Cypress, Calif. 90630

Filed May 4, 1973, Ser. No. 357,163

Int. Cl. G04f *1/00;* **G04b** *17/02*

U.S. Cl. 58—1 **9 Claims**



1. An interval timer comprising:

a pendulum including a bob supported for oscillatory movement about a fixed point;

a closure member which is magnetically attracted to said bob;

said closure member being positioned beneath the rest point of the bob; and

said closure member being movable from a closed to an open position by the magnetic attraction between the bob and closure member when the bob is in its rest position, and

signal means actuatable by movement of the closure member to its open position,

whereby a signal is given when the bob has come to rest through movement of the closure member by magnetic attraction between the bob and closure member.

3,903,685

DIGITAL CLOCK

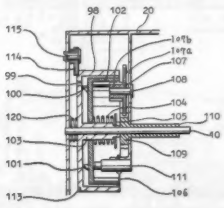
Kenjiro Goto, Tokyo, Japan, assignor to Mansei Kogyo Kabushiki Kaisha, Japan

Division of Ser. No. 409,469, Oct. 25, 1973. This application July 1, 1974, Ser. No. 484,867

Claims priority, application Japan, Nov. 9, 1972, 47-129308[U]

Int. Cl.[2] G04B *13/00*

U.S. Cl. 58—21.1 **13 Claims**



1. A digital clock comprising:

a driving source;

a frame;

a main shaft supported on said frame;

a plurality of time indicating drums rotatably mounted on said main shaft for indicating the time;

a coupling means for forming an operative connection between said driving source and said time indicating drums and adapted to convey a driving force from said driving source to the lowest order time indicating drum of said time indicating drums;

a transmitting means for transmitting said driving force exerted on said lowest order time indicating drum to upper order time indicating drums in order;

a timer mechanism including:

a time setting drum having a side face rotatably fixed on said main shaft,

a cam drum rotatably inside said time setting drum on said main shaft and having a side end formed in cooperative engagement with said side face of said time setting drum,

said cam drum slidably arranged for axial movement toward and away from said time setting drum,

a switch arranged on said frame and operated by the axial movement of said cam drum, and

bias means arranged within said cam drum to bias said cam drum toward said time setting drum;

a second outer shaft rotatably arranged on said main shaft and having one end in engagement with one of said time indicating drums and the other end terminating in a pinion; and

a reduction gear rotatably mounted on said frame to rotate said cam drum at a predetermined rate of reduction and formed with a pinion side adapted to mate with said cam drum and a wheel side adapted to gear with said pinion of said second outer shaft.

3,903,686

CHRONOGRAPH MOVEMENT

Hughes Burki, Vaud, Switzerland, assignor to Societe Suisse pour l'Industrie Horlogere Management, Bern, Switzerland

Filed July 8, 1974, Ser. No. 486,617

Claims priority, application Switzerland, July 10, 1973, 10034/73

Int. Cl. G04f 7/04

U.S. Cl. 58—74 **10 Claims**

1. A chronograph movement comprising an hour-wheel and a minute-wheel continuously driven by a gear-train, and further comprising a chronograph-pinion and a minute-counter, each adapted to be stopped, returned to zero, or connected to said gear-train and driven, wherein said chronograph-pinion and said minute-counter each have toothings countinuously engaged with corresponding toothings of a wheel-and-pinion constituting the driven part of a friction clutch, and the driving part of said clutch is a wheel-and-pinion of said gear-train.

3,903,687

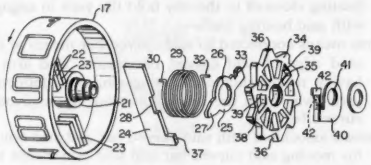
DIGITAL CLOCK OR THE LIKE AND DRIVE UNIT THEREFOR

Edgar E. Marquis, Newtown, Conn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 30, 1974, Ser. No. 437,826

Int. Cl.² G04B 19/02

U.S. Cl. 58—125 C **8 Claims**



1. A digital clock comprising a frame means, a time indicating wheel means rotatably mounted to said frame means, drive means carried by said frame means and being operatively associated with said wheel means to incrementally rotate said wheel means relative to said frame means in a time relation for time indicating purposes and for time setting purposes, said drive means having manual means for manually setting said drive means and thus said wheel means in a desired time indicating position in either a forward direction or in a reverse direction, said drive means including a shaft rotatably carried by said frame means, said wheel means being rotatably disposed on said shaft, said drive means including a timer motor carried by said frame means and being operatively associated with said shaft to continuously drive said shaft in one rotational direction for time producing function, said manual means being operatively associated with said shaft to rotate said shaft in either said one rotational direction or in the opposite rotational direction, said drive means including a torsion spring operatively interconnected to said shaft and drivingly interconnected to said wheel means by latch means operatively associated with said shaft and said wheel means to cause incremental latching and unlatching of said wheel means relative to said frame means whereby said wheel means makes an incremental movement relative to said frame means each time said latch means unlatches said wheel means to cause said torsion spring to move said wheel means relative to said shaft, said torsion spring tend to rotate said wheel means in said one direction as said shaft rotates in said one direction, said latch means including a gear-like member, and a ratchet spring carried by said frame means and being operatively associated with said gear-like member to cause said gear-like member to be held stationary relative to said frame means as said shaft is rotated in said one direction and to cause said gear-like member to rotate with said shaft as said shaft is rotated in said opposite direction.

3,903,688

VARIABLE PITCH AND WIDTH JAW FOR TRACK PRESSES

George L. Robinson, San Mateo, Calif., assignor to Wolff Manufacturing Company, Burlingame, Calif.

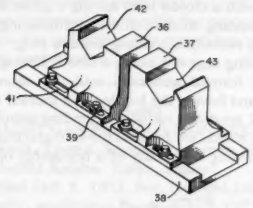
Filed June 28, 1974, Ser. No. 483,980

Int. Cl.² B21L 9/06

U.S. Cl. 59—7 **5 Claims**

1. A variable pitch jaw for use in a track press for removing side links in drive chains of the type having a plurality of sections each including spaced side links joined to one another by pins and bushings in which the drive chain is longitudinally positioned and laterally restrained by a jaw which fits between links and accommodates adjacent bushings, the improvement comprising a jaw assembly including first and second jaw sections each including a transverse groove for accommodat-

ing the bushing of adjacent chain sections and means for adjustably mounting said jaw sections whereby said sections



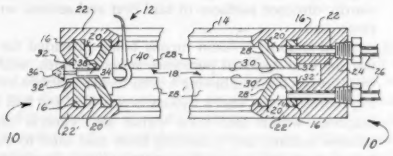
can be moved towards and away from one another to accommodate adjacent bushings having different spacing.

3,903,689

RING-TRAVELER ASSEMBLY FOR A TEXTILE TWISTING MACHINE OR THE LIKE

Kurt Constantine Chilpan, Seneca, S.C., assignor to Roberts Company, Sanford, N.C.

Filed Feb. 20, 1974, Ser. No. 443,970
Int. Cl.[2] D01H *7/52, 7/60*
U.S. Cl. 57—119 **31 Claims**



1. A ring-traveler assembly for a textile yarn twisting machine or the like, comprising:

a ring member having an annular groove extending generally radially therethrough and opening inwardly and outwardly therefrom, and having annular bearing surface means thereon exteriorally of said groove and adjacent the inwardly facing opening thereof;

a traveler member adapted to be mounted upon said ring member, said traveler member having a main body portion impassable through said ring groove and adapted during use of said assembly for sliding engagement with and movement about said ring bearing surface means, and said traveler member having a retractable and extendable anchor portion connected to and spaced outwardly from said traveler main body portion for mounting said traveler member upon said ring member;

said traveler anchor portion in a retracted condition thereof being insertable into and outwardly through said ring groove and, following insertion through said ring groove, being returnable to an extended condition wherein it resists withdrawal back through said groove and secures said traveler member in association with said ring member.

3,903,690

TURBOFAN ENGINE LUBRICATION MEANS

Carmen B. Jones, Oxford, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 331,806, Feb. 12, 1973, Pat. No. 3,861,139. This application Feb. 22, 1974, Ser. No. 445,674
Int. Cl.[2] F02C *7/06*
U.S. Cl. 60—39.08 **4 Claims**

1. A gas turbine engine comprising:

a compressor having bladed stages for pressurizing a flow of air;

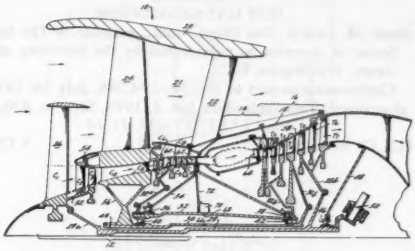
a combustor for receiving said pressurized air, for heating said air, and for ejecting said air in a stream;

a turbine having bladed stages for producing torque from said stream;

bearing means for rotatively supporting said compressor and said turbine;

lubrication supply means supplying lubricant to said bearing means;

first and second substantially coaxial rotatable shafts respectively interconnecting first and second stages of said turbine with first and second stages of said compressor, said bearing means rotatively supporting said first shaft at



two spaced apart locations, said first shaft having the general shape of a pair of cones abutting in a substantially circular junction at their larger ends, said junction disposed intermediate said spaced apart locations, said first shaft further having a plurality of circumferentially spaced radial apertures disposed proximate said junction for the passage therethrough of fluid lubricant discharged by said bearing means at said two spaced apart locations from the radially inner surface of both cones of said first shaft; and

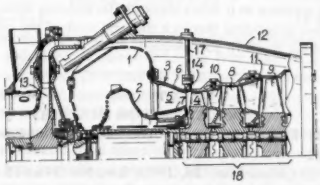
a lubricant collector ring substantially encircling said first shaft proximate said junction for receiving and storing lubricant passing through said apertures as said first shaft rotates.

3,903,691

METHOD AND DEVICES FOR AVOIDING THE FORMATION OF THERMAL IMBALANCES IN TURBINE ENGINES

Joseph Szydlowski, Usine Turbomeca, Bordes (Basses Pyrenees), France

Filed Mar. 19, 1973, Ser. No. 342,881
Claims priority, application France, May 26, 1972, 72.18853
Int. Cl. F02c *7/18*
U.S. Cl. 60—39.66 **4 Claims**



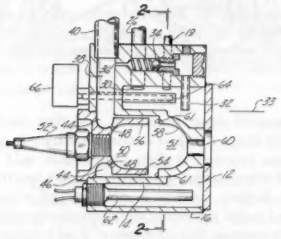
1. A gas turbine engine of the type having an outer casing, a compressor, a combustion chamber, a rotary fuel injector, and a turbine having a plurality of stages each having a rotable turbine wheel connected to said compressor and driving the

same, and a fixed nozzle diaphragm positioned upstream thereof, at least one closed passage extending from said casing through said engine into proximity with at least one stage, means for communicating said passage with a source of compressed air external of said engine, and a terminal jet on said passage for delivering a stream of said compressed air into said one stage about said associated rotable turbine wheel independent of the operation of said engine, said jet being positioned in proximity to the periphery of said associated rotatable wheel and having a port at an angle to the radius line from the axis of said rotatable turbine wheel inclined in the direction opposite to the normal direction of rotation of said rotatable turbine wheel.

3,903,692
HOT GAS GENERATOR

David M. Croker, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 274,786, July 24, 1972, abandoned. This application Jan. 4, 1974, Ser. No. 430,959
Int. Cl.[2] F23D *11/24, 11/44*
U.S. Cl. 60—39.71 **5 Claims**



1. A hot gas generator comprising an annular liquid fuel storage reservoir defined partly by a first imperforate inner annular wall and a second imperforate outer annular wall; means for heating the fuel in the fuel storage reservoir to thereby preheat the inner annular wall; the inner surface of said inner wall serving to define a combustion chamber; a hollow combustion cup extending into the combustion chamber, said cup including an end wall and a third annular side wall spaced inwardly from the first inner annular wall to cooperate therewith in defining an annular fuel-air inlet space for the combustion cup interior; an air supply passage having a tangential connection with the annular inlet space at a point near the cup end wall; means for injecting preheated liquid fuel from the reservoir into the air supply passage; said fuel injecting means being connected to the air supply passage at a point upstream from the aforementioned tangential connection, whereby fuel and air are mixed during movement thereof through the passage and annular inlet space, said tangential connection serving to impart a circumferential spin to the fuel-air mixture as it flows through the annular inlet space; and an igniter extending through the end wall of the cup to ignite the fuel-air mixture therewithin.

3,903,693
ROCKET MOTOR HOUSING

Anthony Fox, 8306 Queen Ave. South, Minneapolis, Minn. 55431

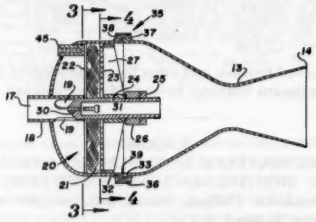
Filed Mar. 26, 1973, Ser. No. 344,615
Int. Cl. F02k *9/02*
U.S. Cl. 60—200 R **3 Claims**

1. Rocket motor thruster means comprising:

a. a casing consisting of a forward segment and a trailing segment joined together at a mid-point, said casing means enclosing and housing a fuel inlet orifice, a catalytic fuel ignition screen plate with a pair of opposed perforate support plates on opposite surfaces thereof disposed in said forward segment, a combustion chamber and exhaust nozzle means, said forward segment being generally cup-shaped with a closed base having a generally upstanding wall extending therefrom and terminating along a first generally radially extending annular ring;

b. said trailing segment being a sleeve having a radial constriction formed generally mid-way along the length thereof and having the leading end thereof terminating in a second generally radially extending annular ring;

c. coupling means joining said forward and trailing segments and consisting essentially of a releasably openable annular retaining ring having a central hoop segment with radially inwardly directed flanges at the edges thereof and engaging and retaining the opposed outer radially outwardly directed surfaces of said first and second annular rings; and

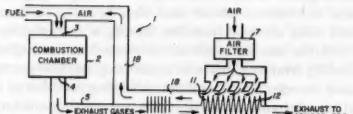


d. central support column means being provided for supporting said opposed perforate support plates, said central support column having a bore formed therein extending therethrough, and a bypass is provided for fuel being disposed within said bore within said central support column means, and extending from said inlet to the exhaust chamber, and said support column terminating in an orifice disposed upstream of said radial constriction.

3,903,694
EXHAUST EMISSION CONTROL MEANS FOR INTERNAL COMBUSTION APPARATUS

Harry E. Aine, 1804 Stierlin Rd., Mountain View, Calif. 94040

Division of Ser. No. 152,676, June 14, 1971. This application May 16, 1973, Ser. No. 360,800
Int. Cl. F02b *75/10*
U.S. Cl. 60—274 **19 Claims**



1. In an exhaust emission control apparatus for use with an internal combustion device having a combustion chamber for burning combustible material in air and an exhaust pipe for exhausting gaseous combustion products from the combustion chamber to the atmosphere and including:

gas separator means for separating smog producing unburned hydrocarbon gaseous constituents of the exhaust gases from permanent gas constituents of the exhaust gases, said gas separator means including a membrane means constructed of a material which has a permeability for permanent gases which is substantially less than its permeability for unburned hydrocarbon gaseous smog producing constituents of the exhaust gases;

means for connecting said gas separator in gas communication with the exhaust pipe for directing the exhaust gases containing smog producing constituents through said gas separator means for contacting a first side of said membrane with the exhaust gases; and

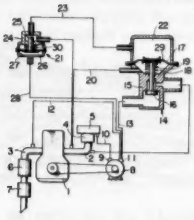
means in gas communication with the second side of said membrane for collecting the separated gaseous smog producing constituents.

3,903,695

EXHAUST GAS PURIFICATION SYSTEM

Masahiko Nakada, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 9, 1973, Ser. No. 404,145
Claims priority, application Japan, Feb. 7, 1973, 48-14594
Int. Cl.² F02B *75/10*; F01N *3/00*
U.S. Cl. 60—290 **4 Claims**



1. In an air injection exhaust gas purification system for an internal combustion engine including fuel intake means, exhaust gas discharge means, and an air pump driven by said engine for supplying secondary air to said exhaust gas discharge means, the combination comprising after-burning prevention air supply means including a first pipe for supplying a portion of the air from said air pump to said intake means, a control valve intermediately located in said first pipe including first valve means adapted to be opened and closed to control air flow in said first pipe, first means applying the pressure in said intake means to control said first valve means to open only upon occurrence of a sudden rise in negative pressure in said fuel intake means, a regulator valve including second valve means adapted to be opened and closed in response to the discharge pressure of said air pump, second means for applying said negative pressure in said intake means through said second valve means to said first valve means to prevent opening of said first valve means when the discharge pressure of said air pump is below a predetermined level, and means for applying the discharge pressure of said air pump to said regulator valve as a control signal indicative of engine operating speed, said regulator valve being arranged to close said second valve means when the discharge pressure of said air pump is above said predetermined level thereby to prevent application of said fuel intake means pressure to said first valve means by said second pressure applying means when said engine is operating above a predetermined operating level commensurate with said predetermined level of said air pump discharge pressure.

3,903,696

HYDRAULIC ENERGY STORAGE TRANSMISSION

Vincent E. Carman, 10728 NE Halsey, Portland, Oreg. 97220

Filed Nov. 25, 1974, Ser. No. 526,540
Int. Cl.² F15B *1/02*
U.S. Cl. 60—414 **4 Claims**

1. On a wheeled vehicle, a hydraulic braking and accelerating system to selectively collect and store energy normally lost in braking the vehicle and to release the stored energy to aid in accelerating the vehicle, said system comprising:

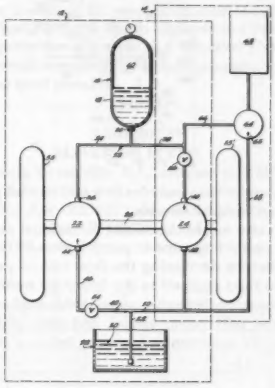
an accumulator means to be hydraulically pressurized including a receptacle with port means,

a hydraulic pump means and motor means with an inlet and an outlet, said pump and motor means being hydraulically connected to the accumulator means, said accumulator means being hydraulically between said pump means and said motor means, said pump and motor means having shaft means connected to wheels of the vehicle,

a reservoir of hydraulic fluid,

first conduit means to connect the accumulator means and the pump and motor means, and

second conduit means to connect the reservoir and the pump and motor means, and



first operator means for selective operation

a. to permit fluid flow between the reservoir and the accumulator means through said pump means when the vehicle is being braked to store some braking energy in the accumulator means and

b. to prohibit the flow when the vehicle is not being braked,

second operator means for selective operation

a. to permit fluid flow between the accumulator and reservoir through said motor means to release stored energy in the accumulator when the vehicle is being accelerated and

b. to prohibit flow when the vehicle is not being accelerated.

3,903,697

VARIABLE SPEED HYDRAULIC DRIVE

Byron Snyder, Enid, Okla., assignor to Azcon Corporation, St. Louis, Mo.

Filed July 24, 1974, Ser. No. 491,286
Int. Cl.² F15B *11/20*
U.S. Cl. 60—421 **11 Claims**

1. In combination with a drilling apparatus having a drill string and a drill bit connected to the free end of the drill string, a power drive apparatus for rotating the drill string and drill bit, said power apparatus comprising:

a. a source of hydraulic fluid;

b. pump means connected to said source and operable to pump hydraulic fluid therefrom;

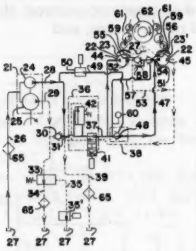
c. a drive unit including a plurality of hydraulically operated motor means operative for rotating the drill string;

d. a conduit system connected to said hydraulic motor means and said pump means for conducting pressurized hydraulic fluid from said pump means to said hydraulic motor means, said conduit system including supply conduits each connected to a respective said hydraulic motor

means and exhaust conduits each connected to a respective said hydraulic motor means;

e. first valve means connected to one of said supply conduits for selectively permitting hydraulic fluid to flow to said plurality of hydraulic motor means and one of said hydraulic motor means exhaust conduit;

f. second valve means connected between one hydraulic motor means supply conduit and the remaining hydraulic motor means exhaust conduit selectively preventing flow of hydraulic fluid therebetween;



g. said pump means includes first and second pumps having different volume outputs;

h. third valve means connected to said first pump for selectively permitting same to pump hydraulic fluid to a reservoir thereby decreasing the flow rate of pressurized hydraulic fluid pumped to the hydraulic motor means; and

i. a pressure relief valve connected to said conduit system between said pump means and said hydraulic motor means for maintaining pressure below a predetermined level.

3,903,698

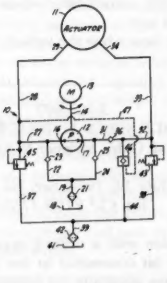
HYDRAULIC SYSTEM WITH BI-ROTATIONAL PUMP WITH FILTER TITLE

Robert K. Gellatly, Los Gatos; Joel B. Meredith, San Carlos, and Richard A. Green, Mountain View, all of Calif., assignors to General Cable Corporation, San Carlos, Calif.

Division of Ser. No. 442,483, Feb. 14, 1974, Pat. No. 3,864,911. This application Dec. 5, 1974, Ser. No. 529,601

Int. Cl.[2] F15B *21/04*

U.S. Cl. 60—453 **12 Claims**



1. In a system for operating an hydraulic actuator, the combination of a reversible pump having first and second ports each of which is capable of assuming pressure and suction functions depending upon the direction of operation of the pump, fluid circuit means for directing fluid between the ports of the pump and said actuator, said circuit means including fluid reservoir means, a suction circuit to direct fluid from the reservoir means to said ports, a first supply circuit to direct fluid under pressure from the first port to said actuator, a second supply circuit to direct fluid under pressure from the second port to said actuator, one-way valve means in said second supply circuit to permit fluid flow therethrough only in a direction from said pump, a return circuit to direct return fluid from the actuator to the reservoir means, filter means for filtering fluid in the return circuit, and by-pass circuit means for directing fluid from the portion of said second supply circuit in the check flow direction of said one-way valve means through the return circuit and through the filter means responsive to pressure in said first supply circuit exceeding a given predetermined value.

3,903,699

SOLAR ENERGY POWER SYSTEM

Billy K. Davis, Huntsville, Ala., assignor to The United States of America as represented by the United States National Aeronautics and Space Administration Office of General Counsel-Code GP, Washington, D.C.

Filed Dec. 4, 1973, Ser. No. 421,702

Int. Cl. F03g *7/02*

U.S. Cl. 60—641 **11 Claims**

1. A solar energy power system comprising:

a boiler comprising:

a fluid inlet,

a fluid chamber comprising a plurality of boiler tubes having an outer surface adapted to receive radiant energy and said surface being titanium anodized to a blue surface characterized by an absorptivity of from 0.70 to 0.74 and said surface being polished to a degree yielding emissivity of between 0.15 and 0.16,

fluid within said chamber, and

a fluid outlet;

heat storage means comprising:

a container,

a heat exchange line having fluid couplings thereto and said line extending through and providing a heat exchange surface within said container, and

a mass of material within said container and in engagement with said heat exchange line and adapted to be heated and melted when the temperature of said line exceeds the temperature of said material and to give off heat to said line and solidify when the temperature of said material exceeds the temperature of said line;

a vapor-pressure powered engine having a vapor inlet and outlet;

first coupling means for selectively coupling either:

said heat exchange line of said heat storage means between said outlet and said inlet of said boiler, or

said heat exchange line of said heat storage means between the outlet and inlet of said boiler and the outlet of said boiler to said vapor inlet of said engine;

condensing means having a vapor inlet and fluid outlet adapted to condense the vapor output of said engine; and

second coupling means for selectively coupling either the fluid output of said condenser to the inlet of said boiler or coupling the output of said condenser through said heat exchange line of said heat storage means to the vapor inlet of said engine.

11. A solar energy power system comprising:

a vapor-powered engine having a vapor inlet and outlet;

a generally planar radiant condenser having an inlet and outlet and comprising a plurality of flexible heat pipes

arranged side-by-side and said inlet being connected to the vapor outlet of said engine;

a generally planar solar boiler having an inlet and outlet and further comprising:

a plurality of fluid coupled boiler tubes, each tube being diamond shaped in cross-section, and said tubes being positioned symmetrically side-by-side and being oriented and positioned whereby a common plane would intersect a pair of opposite edge corners of said boiler tubes, and

a generally planar reflector assembly of repeated V-shaped reflectors symmetrically positioned with respect to said boiler tubes whereby each of said tubes is positioned within a V and oriented whereby solar radiant energy striking a said reflector is directed onto the surface of one tube and then over to the surface of an adjacent tube;

mounting means for positioning said planar solar boiler and said planar radiant condenser perpendicular with the planar said radiant condenser extending centrally from a back side of said reflectors whereby the combination of said solar boiler and said radiant condenser is essentially of a T shape; and

means for coupling the outlet of said radiant condenser to an inlet of said solar boiler.

3,903,700

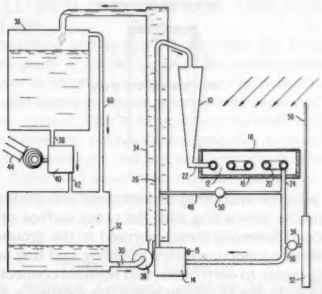
SUNSHINE HYDRO ELECTRICITY

Leonard Glickman, 3001 N. Bay Rd., Miami Beach, Fla. 33140

Filed Dec. 20, 1973, Ser. No. 426,529

Int. Cl. F03g *7/00*

U.S. Cl. 60—641 **4 Claims**



1. Apparatus for converting solar energy into electrical energy comprising a reservoir for containing an expansible fluid, a solar heat generator, a first conduit means in communication between said reservoir and said heat generator for delivery of the expansible fluid from said reservoir to said heat generator, said heat generator being responsive to solar energy to heat the fluid delivered thereto, discrete upper and lower reservoirs for containing water, means in communication between said upper and lower reservoirs including a pump for pumping water from said lower reservoir to said upper reservoir, a motor, second conduit means in communication between said heater and said motor for delivery of the heated fluid to said motor for driving the latter, means coupled between said motor and said pump whereby said pump is driven by said motor thereby enabling said pump to pump water from said lower reservoir to said upper reservoir, a hydro-electric generator at an elevation lower than said upper reservoir, means in communication between said upper reservoir and said generator for delivery of water from said upper reservoir to said generator thereby enabling said generator to produce electrical energy. A third conduit means in communication with said motor and said fluid reservoir for returning the fluid from said motor to said fluid reservoir, said solar heat generator including a closed container, a plurality of pipes in communication one with the other for carrying the expansible fluid and lying within said container whereby the fluid is adapted to be heated by solar energy from the sun, said third conduit means including means for cooling the fluid flowing from said motor, a relief conduit in communication with the fluid in said heat generator and said third conduit means, a valve in said relief conduit for flowing fluid from said heat generator to said third conduit means in response to a fluid pressure in said heat generator in excess of a predetermined pressure, a solar energy shield for reducing the amount of solar energy received by said solar heat generator, means for deploying said shield at least in partial overlying relation to said container to reduce the amount of solar energy received by said solar heat generator and in response to a fluid pressure in said heat generator in excess of a specified pressure, said specified pressure constituting a fluid pressure below said predetermined fluid pressure.

3,903,701

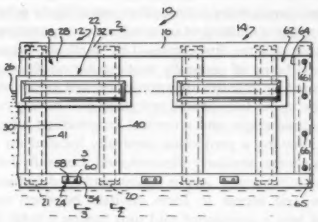
FLOATING BOOM

George J. Gauch, Greenville, R.I., assignor to Uniroyal, Inc., New York, N.Y.

Filed Apr. 22, 1971, Ser. No. 136,377

Int. Cl.[2] **E02B** *15/04*

U.S. Cl. 61—1 F **11 Claims**



1. A floating boom comprising an elongate sheet member of flexible material, a plurality of resilient stiffener members secured upon and extending in parallel relation laterally of said sheet member, said stiffener members being spaced from one another longitudinally of said sheet member and defining therebetween flexible sheet zones universally responsive flexibly to undulating surges of liquid flow thereagainst, said stiffener members each comprising spring steel and having a common narrow extent of substantially lesser dimension than the extent of said flexible sheet zones longitudinally of said sheet member, and a plurality of elongate float members secured in colinearly endwise spaced relation upon and extending in a common longitudinal direction with said sheet member, said float members bridging respective pairs of said stiffener members which are spaced from one another longitudinally of said sheet member through the intermediary of respective alternate flexible sheet zones, said float members overlying respective portions of flexible sheet zones which are disposed between the stiffener members of each bridged pair and which alternate with said alternate flexible sheet zones, said float members being intermediately disposed between longitudinally extending marginal edges of said sheet member such that the latter is generally divided longitudinally into an upper debris-confining section and a lower fluid-submergible section, said boom thereby being flexible both longitudinally and laterally thereof, whereupon, when subjected to undulating surges of liquid flow thereagainst, said alternate flexible sheet zones which are disposed between respective bridged pairs of stiffener members, said flexible sheet zones which are respectively disposed between the stiffener members of each bridged pair, and said stiffener members all flexibly respond

as an energy absorbing array which is at least partially reinforced against buckling by said float members which bridge the respective pairs of said stiffener members.

3,903,702

REVETMENT STRUCTURE

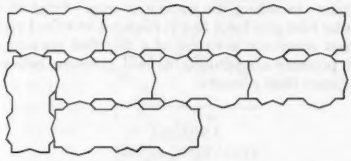
Samuel Alan Appleton, Taunton, England, assignor to Dytap Construction Holdings Ltd., England

Filed May 8, 1973, Ser. No. 358,310

Claims priority, application United Kingdom, May 9, 1972, 21600/72

Int. Cl. E02b *3/12*

U.S. Cl. 61—37 3 Claims



1. A revetment or earth facing structure laid directly on the earth comprising a plurality of interfitting units to form a flexible mattress and including means defining cavities therethrough which are filled with said earth to stabilize and retain said revetment on said earth, said units being similar to one another, said units interlocking after assembly to substantially minimize rotative shifting of units adjacent any units subjected to a rotative, shifting force caused by earth movement, each of said units being of generally rectangular configuration and being formed by a series of interconnected ribs which taper towards the upper face of said unit, said unit having two parallel longitudinal edges and a central longitudinal axis, each of said edges having a projection centrally located on one half thereof, a recess, similarly dimensioned, centrally located on the other half thereof and a space provided between each projection and recess to form cavities between said units assembled into a revetment said unit having a total length of twice its breadth plus a relatively small allowance for joint thickness, each projection having sides which slope to a point of the projection farthest from the axis, each recess having sides which slope to a point of the recess nearest the axis, the projections and recesses interfitting with recesses and prpjections respectively of identical units to form said revetment, the projections and recesses on one said edge being reflections in the axis of the projections and recesses respectively of the other edge, the projections and recesses of said each of said units being provided with sockets receiving linking members for transmitting forces between adjacent units in a direction perpendicular to the plane of said revetment, whereby any heaving or shifting in the earth with resultant movement of units adjacent any one unit will cause substantially only nonrotative shifting of such one unit thereby substantially negating breaking up of the interfitting structure of the identical units forming said revetment.

3,903,703

SELF-ADVANCING MINE ROOF SUPPORTS

Walter Lubojatsky, Recklinghausen, Germany, assignor to Becorit Grubenausbau GmbH, Recklinghausen, Germany

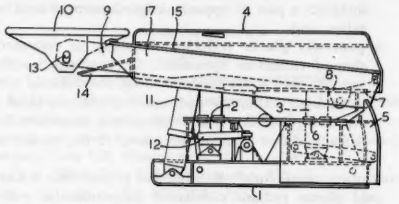
Filed Apr. 30, 1974, Ser. No. 465,622

Claims priority, application Germany, May 19, 1973, 2325480

Int. Cl.[2] E21D *11/16*

U.S. Cl. 61—45 D 6 Claims

1. A mine roof support with a base plate on which prop means carry a first roof supporting member and with a second roof supporting member in front of the first roof supporting member which is movable relatively thereto towards the working face and carried by connecting elements of shield-like construction arranged on either side of the first roof supporting member, said connecting elements are guided longitudinally and pivotally supported at their rear ends on both sides of the first roof supporting member at a distance below the roof engaging surface thereof, are pivotally connected with their forward ends to the second roof supporting member and



are supported by further prop means which is attached to the base plate and tiltable in a direction towards the working face, wherein the connecting elements are provided with laterally extensible shield parts which are guided in slot guides in the connecting elements and which slot guides extend transversely to the direction of advance of the support.

3,903,704

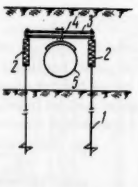
PIPELINE ANCHORING ARRANGEMENT

Viktor Vasilievich Spiridonov, 7 Parkovaya ulitsa, 23a, kv. 64, Moscow, U.S.S.R.

Filed Jan. 9, 1973, Ser. No. 322,196

Int. Cl. E02d *27/36, 27/46;* F16l *3/02*

U.S. Cl. 61—46 7 Claims



1. A pipeline anchoring arrangement comprising first fastening means interacting with the outer surface of the pipeline; second fastening means secured in the ground; at least one resilient connecting means coupling said first and second fastening means to each other, said resilient connecting means changing its length elastically when the pipeline is acted upon by disturbant forces exerted across the axis of said pipeline, said connecting means restoring its initial length after the action of said disturbant forces is removed.

3,903,705

APPARATUS FOR ANCHORING MARINE STRUCTURES

Robert W. Beck, and Lyle D. Finn, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Jan. 24, 1974, Ser. No. 436,253

Int. Cl.[2] E02D *21/00;* B63B *21/00, 21/24*

U.S. Cl. 61—46 8 Claims

1. A marine structure guyed against substantial movement in response to extreme environmental forces comprising:

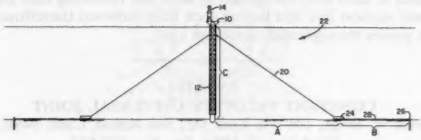
a marine structure positioned in a body of water, a portion of said structure being above the surface of said body of water and a portion of said structure extending from the surface of said body of water to its floor;

a plurality of guy means attached at a first end to said marine structure below the surface of said body of water and at a point between the longitudinal midpoint of said structure and the top of said structure, said guy means being

radially arranged around the periphery of said marine structure;

anchor means associated with each of said guy means, attached to a second end of each of said guy means to anchor each of said guy means to the floor of said body of water; and

clump weight means attached to each of said guy means between said first and second ends of said guy means, said



clump weight means being adapted to be at least partially supported on the floor of said body of water under conditions of stress on said guy means less than that which would effect substantial movement of said marine structure absent said clump weight means and adapted to be raised off the floor of said body of water under conditions of greater stress and wherein the weight of each of said clump weight means is 30 to 60 percent of the maximum allowable tension of each of said guy means.

3,903,706

INSULATING AND PROTECTIVE STRUCTURE FOR FROZEN SUBSTRATES

Felex C. Gzemski, Glen Mills, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Apr. 11, 1974, Ser. No. 459,999

Int. Cl.² E02D *27/32*; **C04B** *43/00*; **C08L** *95/00*

U.S. Cl. 61—50 **6 Claims**

1. An insulating and protective structure for frozen substrates particularly in the Arctic and sub-Arctic regions, comprising a layer of bituminous coated expanded perlite particles applied to said frozen substrate wherein said expanded perlite particles are coated with a bituminous material containing sufficient elastomeric polyurethrane polymer to provide the desired high temperature and low temperature properties for use in the Arctic and sub-Arctic regions, said polyurethane being chemically bound to said bituminous material.

3,903,707

TUNNELING SHIELDS

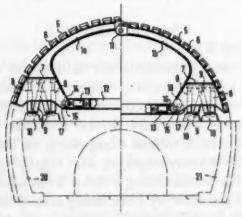
Adolf Folk, Altlunen, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Wethmar near Lunen, Germany

Filed Mar. 20, 1974, Ser. No. 453,125

Claims priority, application Germany, Mar. 24, 1973, 2314703

Int. Cl.² E21D *9/06*

U.S. Cl. 61—85 **5 Claims**



1. A cutter shield, particularly a roof shield for driving underground tunnels and like excavations, comprising:

first and second forward support frames each having a generally arched configuration and comprising two sections which are substantially symmetrical about the peak of the arch which they together form, said sections of the forward support frames being interconnected at said peak for pivotal movement about an axis extending longitudinally of the apparatus,

first and second rearward support frames each having a generally arched configuration, and comprising two sections which are substantially symmetrical about the peak of the arch which they together form, said sections of the rearward support frames being interconnected at said peak for pivotal movement about an axis extending longitudinally of the apparatus,

a first group of planks supported by said first support frames,

a second group of planks supported by said second support frames,

means for displacing said first frames relative to said second frames,

laterally spaced abutments with respect to which the ends of the support frames are to maintain a predetermined relationship, and

means associated with the lower ends of the sections of each support frame for adjusting the spacing of said sections to compensate for irregularities in the spacing of the abutments.

3,903,708

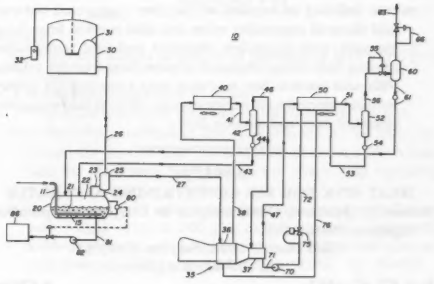
VOLATILE VAPOR RECOVERY SYSTEM AND METHOD UTILIZING JOULE THOMPSON EXPANSION

James Mair, Chicago, Ill., assignor to General American Transportation Corporation, Chicago, Ill.

Filed May 7, 1973, Ser. No. 358,102

Int. Cl.² F13C *5/04*

U.S. Cl. 62—54 **9 Claims**



1. Apparatus for recovering volatile liquids from a vapor stream, said apparatus comprising a plurality of stages of condensing apparatus, each of said stages including a compressor having an inlet and an outlet and ambient-air-cooled condensing means having an inlet connected to the outlet of said compressor and a vapor outlet and a liquid product outlet, the inlet of the first stage compressor being adapted for connection to an associated vapor source for receiving therefrom an input vapor stream, the inlet of said compressor of each of the other stages being connected to the vapor outlet of said condensing means of the immediately preceding stage for receiving the cooled vapor stream therefrom, vent means connected to the vapor outlet of the last stage condensing means for discharging to atmosphere the uncondensed vapor stream therefrom, compressor cooling means for circulating a coolant other than said liquid product through said compressor in each of said stages and through said condensing means in one of said stages, and a liquid product reservoir connected to the liquid product outlets of said condensing means of each

of said stages for receiving therefrom the recovered liquid product.

3,903,709

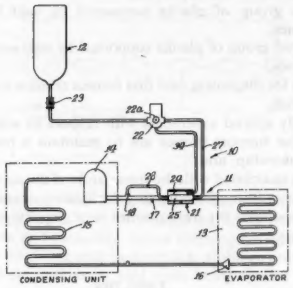
REFRIGERANT CHARGING APPARATUS

Richard M. Anderson, Smyrna, and James M. Sykes, Nashville, both of Tenn., assignors to Heil-Quaker Corporation, Lewisburg, Tenn.

Continuation-in-part of Ser. No. 430,182, Jan. 2, 1974, abandoned. This application Oct. 15, 1974, Ser. No. 514,413

Int. Cl.[2] F25D *45/00*

U.S. Cl. 62—77 **43 Claims**



1. In a refrigerant charging apparatus having a thermal expansion valve provided with a temperature sensing bulb, and a source of liquid refrigerant for charging an operating refrigeration system including a compressor, a condenser, an evaporator, an expansion device connecting the evaporator with the condenser, and a suction line connecting the evaporator to the compressor and including a charging port, the improvement comprising

means defining an expansion chamber connected between said thermal expansion valve and said suction line charging port, said expansion chamber and said temperature sensing bulb being disposed in mass heat transfer relation with said suction line to cause said temperature sensing bulb to respond to the temperature of both said expansion chamber and said suction line.

3,903,710

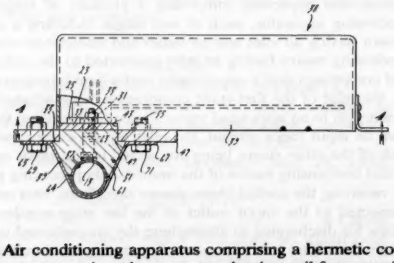
HEAT SINK FOR AIR CONDITIONING APPARATUS

Robert J. Quatman, Ohio, assignor to Chrysler Corporation, Highland Park, Mich.

Filed Dec. 5, 1974, Ser. No. 529,761

Int. Cl.[2] F25B *43/00*

U.S. Cl. 62—513 **6 Claims**



1. Air conditioning apparatus comprising a hermetic compressor-motor unit, at least one condensing coil for removing heat from refrigerant, a suction line for delivering refrigerant to said hermetic compressor-motor unit, a discharge line for delivering compressed refrigerant from said hermetic compressor-motor unit to said condensing coil, and electrical control means for controlling the operation of said hermetic compressor-motor unit, said control means including a support, an electrical control unit mounted on said support, said control unit including an electronic component which generates heat, and means for removing said heat comprising a heat sink member connected to said support, means for transferring heat from said electronic component to said heat sink, said heat sink being in contact with said suction line to transfer heat to such line, refrigerant in such line removing heat from said suction line and having such heat removed therefrom as it passes through said condenser coil.

3,903,711

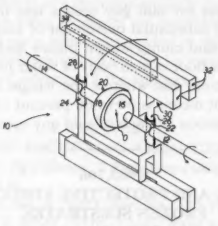
CONSTANT VELOCITY UNIVERSAL JOINT

Jack W. Stage, 100 Mt. Lyell Dr., San Rafael, Calif. 94903

Filed Apr. 8, 1974, Ser. No. 458,762

Int. Cl. F16d *3/30*

U.S. Cl. 64—21 **6 Claims**



1. A constant velocity universal joint comprising:

input and output shafts;

a ball on one of said shafts and a socket on the other of said shafts, said ball and socket being engaged over sufficient area to insure that they pivot about a constant center point;

a torque transmitting slide member carried on each of said input and output shafts to pivot about an axis normal to said shaft;

the pivotal axes of said motion transmitting slide members being in a common plane and equidistantly displaced from said constant center point; and

said slide members extending along said common plane across said ball and socket joint, and in nested sliding engagement for relative sliding movement along said common plane.

3,903,712

DRIVE UNIT

Gerhard Richter, Wuppertal, and Klaus Stein, Neviges, both of Germany, assignors to Vorwerk & Co. Elektrowerke KG, Wuppertal, Germany

Filed Mar. 11, 1974, Ser. No. 450,224

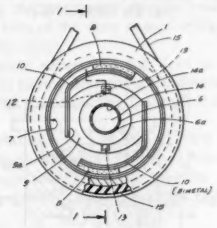
Claims priority, application Germany, Mar. 14, 1973, 2312636

Int. Cl. F16d *7/02*

U.S. Cl. 64—30 E **9 Claims**

1. A drive unit, especially for household appliances and floor-treating machines, comprising a drive member; a driven member; one of said members having an engaging surface; and clutch means between said driven member and said drive member, said clutch means comprising at least one friction member for frictionally engaging said engaging surface of said one member for transmitting a drive from said drive member to said driven member by permitting said friction member to slip relative to said engaging surface upon blocking of said driven member under simultaneous creation of heat in said friction member, and means connecting said friction member to the other member and arranged to be in direct contact

along a portion thereof with said friction member so that the heat created in said friction member will be transmitted to said

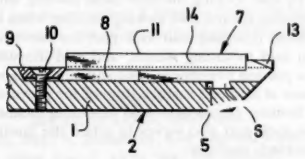


last-mentioned means to thereby control the frictional engagement between said engaging surface and said friction member in dependence on the temperature of the latter.

3,903,713
DIAL NEEDLE BED FOR CIRCULAR KNITTING MACHINE

Alois Hanton, Brno, Czechoslovakia, assignor to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstri, Brno, Czechoslovakia

Filed Mar. 7, 1974, Ser. No. 448,984
Claims priority, application Czechoslovakia, Apr. 30, 1971, 3153-71
Int. Cl.² D04B *15/100*
U.S. Cl. 66—19 **2 Claims**

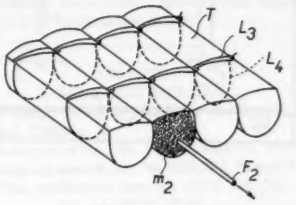


1. A dial needle bed for circular knitting machines, comprising a dial bed body with radially arranged grooves, upstanding elongated rib-forming members inserted into these grooves, the external portions of the ribs, outwardly of the grooves, forming lateral guides for knitting needles, the width of each groove being stepped up in its longitudinal direction on one side, the narrower part of each groove being closer to the center of the body of the needle bed, the shape of the part of each rib engaging into the groove corresponding to the shape of the groove, the confronting surfaces of successive ribs disposed outwardly of their respective grooves being parallel so as guidingly to receive a parallel-sided needle between them.

3,903,714
QUILTED FABRIC AND METHOD

Bohumir Horeni, Hlavni; Vladimir Zid, Liberec; Bohuslav Neckar, Liberec, and Jan Prochazka, Liberec, all of Czechoslovakia, assignors to Statni vyzkumny ustav textilni, Liberec, Czechoslovakia

Continuation-in-part of Ser. No. 847,194, Aug. 4, 1969, abandoned. This application July 9, 1973, Ser. No. 377,408
Claims priority, application Czechoslovakia, Aug. 6, 1968, 5696-72
Int. Cl. D04b *23/10*
U.S. Cl. 66—193 **10 Claims**



1. A quilted fabric comprising a fibrous web fill and a reinforcing thread network applied in a warp knit system having a plurality of wales and courses, wherein the number of courses per 10 cm being at least equal N, N being determined by the equation

$$N = \frac{7589.46}{\sqrt{T}} + 100B\left(1 - \sqrt{1 + \frac{151.79}{B\cdot\sqrt{T}}}\right)$$

where B is determined by the equation

$$B = \frac{2.88 \cdot G}{T \cdot m \cdot \gamma(0.483 + \alpha)}$$

wherein

G = specific weight in g/sq.m of the fibrous web to be processed

T = binding thread titre in denier

γ = specific gravity in g/cu.cm of the fibers in the web

m = the filling coefficient constant defined as the ratio between the sum of fiber cross section areas in a stitch loop and the total area confined by the stitch loop equalling 0.40

α = the constant relating to machine operation a fibrous web weight of up to 200 g/sq.m α equals zero while with a fibrous web of weight in the range of 200 to 600 g/sq.m, α is determined by the equation $\alpha = 0.002 \cdot G - 0.400$.

3,903,715
PROCESS AND DEVICE FOR THE PRODUCTION OF IRREGULAR DESIGN EFFECTS ON FLAT STRUCTURES

Manfred Plötz, Wustems, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 3, 1973, Ser. No. 385,322
Claims priority, application Germany, Aug. 7, 1972, 2238782
Int. Cl.² D06B *1/02*
U.S. Cl. 68—205 R **8 Claims**

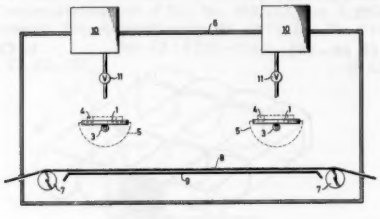
1. A device suitable for carrying out a continuous process for producing irregular design effects by applying dye liquor to flat structures in the form of spots or strokes of different size with the aid of centrifugal force, which device consists of a closable casing in which

a. at least one storage tank for the dye liquor, provided with a discharge tube to control the discharged amount,

b. at least one spreading element for applying the dye liquor to the material, and

c. elements for the horizontal support and transport of the material to be dyed or colored at open width through the treatment zone,

are arranged in the order (a), (b) and (c) independently of one another and one beneath the other, wherein the element (b) is a substantially horizontal circular dye spreading disc



rotatable in either direction about its axis and partly surrounded at its periphery by adjustable boundary shutters or sheets.

6. A device as claimed in claim **1**, wherein the surface of the dye spreading disk is provided with one or more superimposed fins for guiding the liquor, radiating from the center of the disc.

3,903,716

MANUFACTURE OF FUR ARTICLES

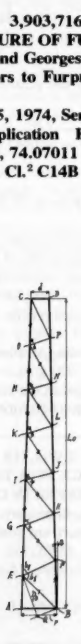
Yves Bernard Duchon, and Georges Jacques Optyker, both of Paris, France, assignors to Furprocess Licensing Co. Inc., Panama, Panama

Filed Aug. 15, 1974, Ser. No. 497,827

Claims priority, application France, Sept. 4, 1973, 73.31866; Mar. 1, 1974, 74.07011

Int. Cl.[2] C14B *1/00*

U.S. Cl. 69—22 **11 Claims**



1. A method of manufacturing a fur strip, comprising cutting a cased fur animal skin along a helicoidal line that forms an angle with the longitudinal direction of the skin depending on the width and the length of the strip to be obtained, and then flattening the resulting strip.

3,903,717

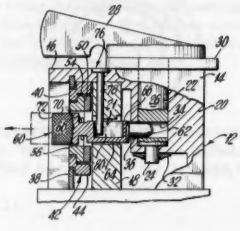
LATCH ASSEMBLY WITH RETAINER FOR LOCKING MEMBER

Michael Rifkin, 458 Lake Ave., Lyndhurst, N.J. 07071

Filed Aug. 6, 1973, Ser. No. 386,235

Int. Cl. E05b *37/02*

U.S. Cl. 70—89 **8 Claims**



1. In a latch assembly, an elongated locking member longitudinally movable between a locking position and an unlocking position, a pair of rotary means surrounding and freely turnable with respect to said locking member and shaped for retaining the latter in said locking position thereof except when both of said rotary means are simultaneously in given angular positions, respectively, for releasing said locking member for movement to said unlocking position thereof, mounting means mounting said locking member for longitudinal movement between said positions thereof and said pair of rotary means for rotary movement with respect to said locking member, said pair of rotary means and said mounting means all carrying visual indicating means for visually indicating at a front surface of said mounting means and pair of rotary means when said pair of rotary means are in said given angular positions, respectively, limiting means carried by said mounting means and cooperating with said locking member for limiting the latter to movement only between said locking and unlocking positions thereof, so that said locking member cannot be removed from said mounting means, said mounting means having an exterior surface and said limiting means having an end surface flush with said exterior surface of said mounting means, and a movable lock part movably carried by said mounting means and acted upon by said elongated locking member when the latter is in its locking position to be prevented by said locking member from moving with respect to said mounting means, said locking member when in its unlocking position releasing said lock part for movement with respect to said mounting means, and said movable lock part having a portion overlapping and slidably engaging said limiting means at said end surface thereof for preventing removal of said limiting means from said mounting means so that said movable lock part also serves to retain the limiting means in its assembled condition.

3,903,718

DOOR LOCKING DEVICE

Aaron M. Fish, Montreal, Canada, assignor to Unican Security Systems, Ltd., Montreal, Canada

Continuation-in-part of Ser. No. 335,904, Feb. 26, 1973, abandoned. This application Apr. 25, 1974, Ser. No. 463,911

Int. Cl.[2] E05B *63/14*

U.S. Cl. 70—156 **1 Claim**

1. In combination with a door having adjacent first and second holes therethrough at a zone near one edge of the door,

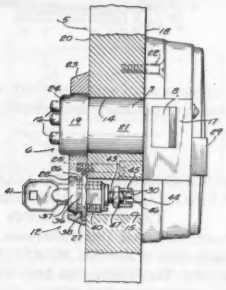
a permutation lock mounted on the door at said zone and having a latch bolt movable from a projected to a retracted position to free the door for opening, a control shaft which is rotatable in one direction out of a normal position to effect retraction of the bolt, decoding means which must be actuated in accordance with a prescribed

schedule in order to free the control shaft for such rotation, and said control shaft being at all times rotatable in the other direction out of its normal position to effect resetting of the combination:

A. said permutation lock having a rear housing section containing the mechanism thereof and which overlies the inner face of the door at said zone to conceal said holes in the door;

B. a front plate secured to the door at the outer face thereof and having first and second holes therein which register with the respective first and second holes in the door;

C. said permutation lock having another housing section which projects forwardly from said rear housing section and through said first holes to have a front portion thereof accessible at the outer side of said front plate;



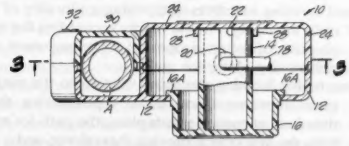
D. actuating means for said decoding means mounted on the front portion of said other housing section so as to be accessible from the outer face of the door;

E. said control shaft being operatively connected with the mechanism in said rear housing section and projecting forwardly therefrom part way into said second hole in the door;

F. a key operable cylinder lock mechanism secured to the front plate in said second hole thereof for actuation of its cylinder by a suitable key from the outer side of the door, said cylinder lock mechanism projecting into said second hole in the door so as to conceal the control shaft, and the cylinder thereof having a portion adjacent to said control shaft;

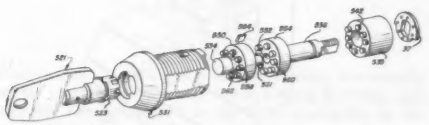
G. and means providing a rotation transmitting connection between said adjacent portions of the cylinder and control shaft.

3,903,719
BICYCLE LOCK ASSEMBLY
Harold Katz, 8851 S. Broadway, Los Angeles, Calif. 90003
Filed Aug. 2, 1974, Ser. No. 494,040
Int. Cl.[2] B62H *5/16;* **E05B** *71/00*
U.S. Cl. 70—227 **5 Claims**



1. A lock assembly to be mounted on a bicycle, or the like, said bicycle including a frame formed of tubular members, said lock assembly including: an elongated housing having a circular opening in one side thereof adjacent one of its ends; a rotor rotatably mounted in the housing coaxial with said circular opening and having an integral coaxial knob protruding through the opening in the housing, said knob having an inner flange engaging the inner surface of the housing around the circular opening therein to retain the rotor in the housing and to form a bearing surface for the rotor; a cover mounted on the other side of the housing adjacent the aforesaid one of its ends and having an annular ridge on the inner surface thereof coaxial with the opening in the housing, said ridge forming a bearing for rotatably receiving the end of the rotor remote from the operating knob; a clamp mounted on the other side of the housing adjacent to said cover and at a position displaced from the rotor for mounting the housing on one end of the tubular members of the bicycle with the tubular member extending transversely through the housing and clamp through slots in the edges thereof.

3,903,720
AXIAL LOCK AND KEY
Frank J. Scherbing, Niles, Ill., assignor to Security Devices Incorporated, Chicago, Ill.
Continuation-in-part of Ser. No. 37,686, May 15, 1970, which is a continuation-in-part of Ser. No. 620,784, March 6, 1967, abandoned. This application Jan. 30, 1973, Ser. No. 328,112
Int. Cl. E05b *27/08*
U.S. Cl. 70—363 **3 Claims**



1. In an axial tumbler lock having a barrel housing, a rotary holder assembly carrying at least one set of lengthwise shiftably mounted forwardly projecting code pins spaced about and parallel to an axis of rotation for the holder, a lock shaft drivingly engaged for operation by rotation of the rotary holder assembly, means normally blocking the rotary holder against rotation and responsive upon predetermined lengthwise shifting of the code pins to release the rotary holder assembly, means forwardly of the holder assembly including a center post in engagement with said holder assembly and freely rotatable relative thereto defining a lengthwise narrow annular key entry opening with said barrel housing, a sleeve surrounding said center post and located between the center post and rotary holder assembly including at least one barrier member positioned between outwardly extending adjacent pins in said rotary holder assembly whereby the setting of the lock can be changed by depressing said last mentioned pins and moving the barrier to different locations relative thereto.

3,903,721
COIN BOX LOCK PROTECTIVE DEVICE
Dannie L. Aaron, 5722 Plainview, Houston, Tex. 77017
Filed Feb. 20, 1974, Ser. No. 444,123
Int. Cl.[2] E05B *17/14*
U.S. Cl. 70—423 **6 Claims**

1. A coin box lock protection apparatus for a key actuated lock means having a lock head including a keyway comprising: a hollow lock shield means adapted to be mounted with said lock means for substantially covering the lock head in spaced relationship thereto, said hollow lock shield means having means for providing limited access to the keyway of said lock head to enable passage of a key means having a preselected shape for operating the lock means when desired;

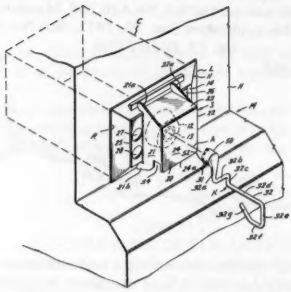
a key means having a preselected shape for passing through said access means and for insertion into the keyway of said lock head, said key means including:

a lock actuating head member having lock tumbler actuating means and having a size slightly smaller than the space between said lock head and said hollow lock shield means

to provide axial alignment of the lock actuating head member with the keyway and insertion therein, and

means mounted with said lock actuating head for inserting said lock actuating head through said limited access means of said lock shield means into the keyway of the lock head and for manipulating the lock actuating head to operate said lock means while said hollow lock shield means covers the lock head of said lock means in spaced relationship thereto sufficiently to substantially block manipulation of a member lacking the preselected shape of said key means for unauthorized lock means actuation, said means including:

a shaft mounted with said lock actuating head member and extending outwardly of said lock shield means with said lock actuating head in axial alignment with the keyway of said lock means said shaft including,



a first offset portion mounted with said lock actuating head member and extending transversely from the axis of said lock actuating head member;

a second offset portion intermediate the length of said shaft, said second offset portion extending laterally from said first offset portion;

a third offset portion intermediate the length of said shaft, said third offset portion extending laterally from said second offset portion in parallel alignment with said first offset portion; and

a fourth offset handle portion extending laterally and outwardly from said third offset portion and in parallel alignment with the axis of the lock actuating head member.

3,903,722

ROLL GROOVING TOOL

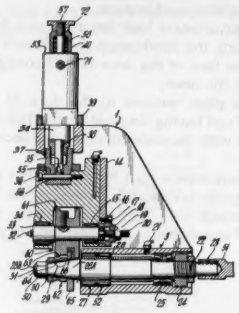
Lawrence W. Thau, Jr., Newark, and Edward E. Coughlan, Jr., Mercerville, both of N.J., assignors to Victaulic Company of America, South Plainfield, N.J.

Filed June 28, 1974, Ser. No. 484,220

Int. Cl.[2] B21D *17/04*

U.S. Cl. 72—105 **13 Claims**

1. A tool for roll grooving of pipe comprising a grooving roll and a backup roll, a first shaft carrying said grooving roll and a second shaft carrying said backup roll, means for maintaining said shafts in spaced parallel relationship, fluid actuated means for moving one of said shafts toward the other of said shafts in a plane defined by the axes of said shafts, and adjustable stop means associated with said fluid actuated means for



limiting the movement of said one shaft toward the other to provide a groove of predetermined depth.

3,903,723

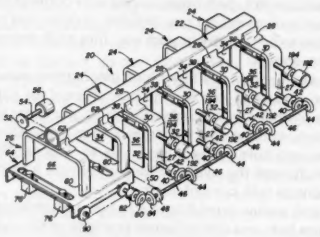
ROLL-FORMING MACHINE FOR MAKING ARTICLES HAVING VARYING CROSS-SECTIONAL CONFIGURATIONS

Dan L. Colbath, P.O. Box 1003, Sherman, Tex. 75090

Continuation-in-part of Ser. No. 355,673, April 30, 1973, Pat. No. 3,748,884. This application May 28, 1974, Ser. No. 473,794

Int. Cl.[2] B21D *5/08*

U.S. Cl. 72—178 **20 Claims**



1. A roll-forming machine comprising:

means defining a path of movement of a workpiece to be formed;

an elongate, rigid spine;

a plurality of sets of upper and lower forming members each supported by the spine and mounted at spaced points therealong for progressively transforming the workpiece from an initial configuration to a desired configuration;

said forming members comprising a plurality of die-stands each including a frame rigidly secured to the spine and a plurality of rollers supported for engagement with material moving along the path;

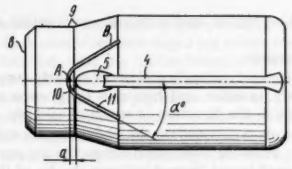
means for locating the spine relative to the path of workpiece movement and thereby positioning the forming members at spaced points along the path for engagement with the workpiece moving therealong; and

means for continuously varying the positioning of the forming rollers transversely with respect to the path as the workpiece moves therealong and thereby forming the workpiece into a desired configuration characterized by a transverse dimension which varies lengthwise of the workpiece.

3,903,724
FLOATING MANDREL FOR DRAWING WELDED TUBES WITH LONGITUDINAL SEAM

Leonid Pavlovich Alekhin, Matveevskaya ulitsa, 6, kv. 56, Moscow; Albert Viktorovich Anisimov, Novomytischinsky prospekt, 23/7, kv. 102, Mytischi Moskovskoi oblasti; Vadim Ivanovich Vikulov, Dubninskaya ulitsa, 63, korpus 1, kv. 56, Moscow; Veniamin Alexeevich Ishunkin, ulitsa Tolbukhina, 12, kv. 86, Moscow; Vyacheslav Fedorovich Kleimenov, Matveevskaya ulitsa, 10, korpus 3, kv. 9, Moscow; Mikhail Zelikovich Lokshin, Slavyansky bulvar, 27, kv. 37, Moscow; Vladimir Alexandrovich Moshkin, Kutuzovsky prospekt, 33, kv. 102, Moscow, and Vadim Yakovlevich Shapiro, ulitsa Govorova, 16, korpus 2, kv. 10, Moscow, all of U.S.S.R.

Filed Sept. 17, 1973, Ser. No. 398,098
Int. Cl. B21c *1/24*
U.S. Cl. 72—283 **2 Claims**



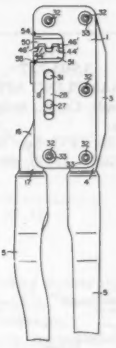
1. A floating mandrel for drawing welded tubes with longitudinal seam, comprising: two cylindrical sections of different diameters; a tapered section interconnecting the cylindrical sections, said sections having a surface contacting an inner surface of the tube, one of said cylindrical sections having a larger diameter, the second cylindrical section having a smaller diameter and an end face; a longitudinal guiding slot to arrange the mandrel with respect to an internal flash in said second cylindrical section having a larger diameter; a throughhole to pass the internal flash removed in the course of drawing into the drawn portion of the tube in said cylindrical section having the larger diameter and directed from the end face of this section towards the guiding slot and extending to said surface of the mandrel with contacts the tube, thus forming a cutting edge; a groove in said contacting surface and encompassing said cutting edge and extending to said cylindrical section having the larger diameter to pass lubricant applied in advance to the inner surface of the tube to the reduction zone behind said cutting edge in the course of drawing.

3,903,725
TONGS WITH A LINEAR WORKING STROKE FOR PRESSING, PERFORATING, SEPARATING AND THE LIKE

Reiner Rommel, Moldaustrasse 6, 3572 Stadt Allendorf, Germany

Filed Sept. 28, 1973, Ser. No. 401,880
Claims priority, application Germany, Apr. 4, 1973, 2316769
Int. Cl.² B21D *37/12*
U.S. Cl. 72—410 **34 Claims**

1. Tongs for forming solderless connections between conductors and adjacent connectors, said tongs comprising a pair of flat matching outer plates and at least one flat intermediate plate superimposed and attached together to form a collet head, the outer plates having matching recesses therein adjacent to a front side of the collet head to form a mouth for the collet head, the intermediate plate being positioned between the outer plates in back of the mouth of the collet head to form a clearance space between the outer plates in front of the intermediate plate, a stationary jaw mounted in the clearance space between the outer plates in front of the intermediate plate and adjacent to an upper end of the mouth of the collet head, a movable jaw positioned adjacent to a lower end of the mouth of the collet head opposite the stationary jaw, a drive mechanism mounted in the clearance space between the outer plates in front of the intermediate plate and adjacent to the movable jaw, the drive mechanism being coupled to the movable jaw and to the outer plates for moving the movable jaw back and forth along a linear working path relative to the

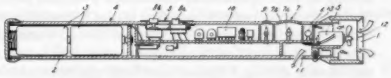


stationary jaw, a stationary handle extending downwardly from the intermediate plate for use in holding the tongs, and a movable handle coupled to the drive mechanism in the clearance space between the outer plates in front of the intermediate plate and movable relative to the collet head and the stationary handle for actuating the drive mechanism to move the movable jaw back and forth along the linear working path relative to the stationary jaw.

3,903,726
GAS DETECTING DEVICE

Yoshiaki Hirosawa, Tokorozawa, and Tsuneo Takahashi, Fukuoka, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 14, 1973, Ser. No. 360,172
Claims priority, application Japan, June 13, 1972, 47-68898; June 13, 1972, 47-68899
Int. Cl.² G01N *31/00*
U.S. Cl. 73—23 **1 Claim**



1. A portable and manually-operated gas detecting device comprising a generally tubular body having the rear portion thereof adapted to form a hand gripping surface; gas inlet aperture means formed at a front end of said tubular body; battery means being positioned in said tubular body proximate the other end thereof; a partition wall extending through a portion of said tubular body; suction fan means in said tubular body supported on said partition wall being located downstream of said inlet aperture means and adapted to be operatively connected to said battery means; gas-sensitive semi-conductor means in said tubular body supported on said partition wall being positioned downstream of said suction fan means so as to receive a stream of gas aspirated by the latter through said inlet aperture means; gas detection indicating means on said tubular body including a viewing window formed in the side wall of the latter communicating with said semiconductor means; operating switch means interconnecting said suction fan means, replaceable battery means and semiconductor

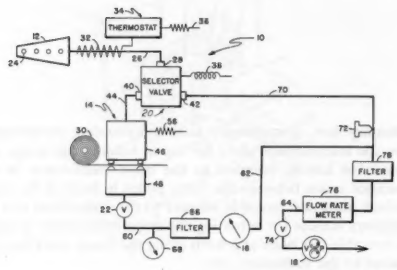
means for actuating said device in gas-detecting relationship; indicator lamp means supported on said partition wall in said tubular body in alignment with said window and adapted to be illuminated upon detection of the presence of a gas in said device; and plate-like barrier means being interposed between said suction fan means and said semiconductor means for deviating the flow of ventilating air, said semiconductor means being adapted to detect the presence of alcoholic fumes in said tubular body.

3,903,727

SMOKE SAMPLING APPARATUS

Ervin J. Sweet, Trumbull, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Nov. 30, 1973, Ser. No. 420,378
Int. Cl.[2] G01N *31/00;* **B01D** *46/18*
U.S. Cl. 73—28 **5 Claims**



1. A smoke sampling apparatus for determining the amount of solid matter in engine exhaust comprising:

a probe positionable in the engine exhaust flow path, said probe capturing a portion of the exhaust passing thereby; a continuously operating vacuum pump;

valve means for selectively operatively connecting said probe with a test line or a bypass line, said valve means having an inlet operatively connected with said probe and first and second outlets, said first outlet being open during a bypass and leak check mode and closed during a test mode, said second outlet being open during a test mode and closed during a bypass and leak check mode;

a bypass line operatively connecting said probe with said vacuum pump wherein gas exhaust is continuously drawn from said probe to said vacuum pump through said first outlet in the bypass mode;

a test line operatively connecting said probe with said vacuum pump wherein gas exhaust is continuously drawn from said probe to said vacuum pump through said second outlet in the test mode;

a test block connected in series with said test line, said test block defining a flow path therethrough;

filter paper secured in said test block across said flow path to accummulate solid particles thereon as gas exhaust is drawn therethrough; and

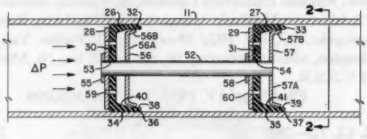
an isolation valve connected between said test block and said vacuum pump to permit leakage checking of the said test block before each test sample of gas exhaust is drawn therethrough, said isolation valve being open during the leak check mode and the test mode and being closed during the bypass mode.

3,903,728

ONE-WAY PIG MEANS

Jamie F. Matthews, Jr., Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed Nov. 5, 1973, Ser. No. 413,007
Int. Cl.[2] G01M *3/08*
U.S. Cl. 73—40.5 R **6 Claims**



1. A pipeline pig for unidirectional travel within a pipeline comprising:

a body member;

at least one cup-type sealing element slidably supported on said body member and having a lip portion extending forwardly in the direction of travel of said pig; and

anchor means positioned on the body member and responsive to a pressure differential across the pig opposite the direction of travel thereof to force the lip of the sealing element against the wall of the pipeline to form a seal therewith, said anchor means being responsive in the anchored mode to a pressure differential across the pig in the direction of travel thereof to release said sealing element to permit the pig to advance within the pipeline.

3,903,729

METHOD AND APPARATUS FOR DETECTING A BREAK OR OTHER OCCURRENCE IN A PIPELINE CONTAINING GAS UNDER PRESSURE

Morris T. Covington, Houston, Tex., assignor to Taft Broadcasting Corporation, Houston, Tex.

Continuation of Ser. No. 196,327, Nov. 8, 1971, which is a continuation of Ser. No. 102,661, Dec. 30, 1970. This application Apr. 9, 1973, Ser. No. 349,422
Int. Cl. G01m *3/00*
U.S. Cl. 73—40.5 R **23 Claims**

1. In a pipeline containing gas under pressure, the method of rapidly detecting at a selected stationary monitoring point in the gas the existence of a distantly occurring break or other occurrence in the pipeline, which break or other occurrence produces a rapid and significant change in the pressure of the gas at the point of the break or other occurrence and causes an adiabatic pressure wave to propagate through the gas at the speed of sound, including the steps of:

continuously transducing transient changes of the pressure of the gas at the monitoring point in the gas into an electrical signal proportional thereto;

continuously monitoring the electrical signal and detecting the portion thereof representative of at least the leading edge of the adiabatic pressure wave created in the gas by the break or other occurrence and propagated through the gas at the speed of sound; and

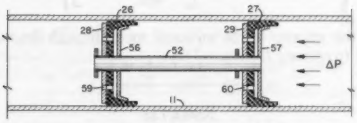
responsive to the detection of the portion of the electrical signal representative of the leading edge of the adiabatic pressure wave, activating means indicative of the existence of the break or other occurrence.

3,903,730

METHOD OF LOCATING PIPELINE LEAKS WITH A ONE-WAY PIG

Jamie F. Matthews, Jr., and William M. McDonald, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Nov. 5, 1973, Ser. No. 413,008
Int. Cl.[2] G01M *3/08*
U.S. Cl. 73—40.5 6 Claims



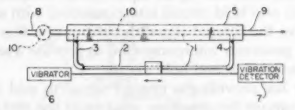
1. A method for determining the presence of leaks in a pipeline which comprises inserting a pig means into a pipeline at a first location, said pig means being adapted to move in only one direction through said pipeline; pumping fluid into said pipeline, to move said pig means from said first location in said pipeline to a third location in said pipeline, discontinuing the pumping of fluid into said pipeline to position said pig means at said third location; passing fluid through said pipeline to create a pressure differential across said pig, wherein relatively low pressure is created in the pipeline between said first location and said pig and relatively high pressure is created in the pipeline portion between a said location and said pig, said pressure differential across said pig being sufficiently great to activate pressure responsive means in said pig means to anchor said pig means in said pipeline at said third location and to form a fluid-tight seal at said third location; maintaining said pressure differential across said pig and simultaneously metering the pressure in said high pressure portion of said pipeline for a pressure decline in said high pressure portion to determine the presence of a leak in said high pressure portion.

3,903,731

APPARATUS FOR DETERMINING PHYSICAL PROPERTIES

Anthony Sieben, Saskatoon, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Canada

Filed Feb. 27, 1974, Ser. No. 446,129
Int. Cl.[2] G01N *11/00*
U.S. Cl. 73—54 9 Claims



1. An apparatus for determining physical properties of a fluid comprising:

a. a conduit defining an endless loop for containing the fluid;

b. said conduit having flexible segments and means for supporting the conduit for longitudinal movement of at least one portion thereof;

c. constant power vibration means for longitudinally vibrating one said portion of the conduit;

d. vibration detecting means for detecting the vibration in said one or other portion of the conduit; and

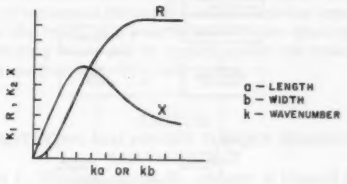
e. inlet means and outlet means communicating with the conduit, said inlet and outlet means being disposed to divide the loop into two substantially equal loop portions.

3,903,732

VISCOSIMETER AND DENSITOMETER APPARATUS

Gerald D. Rork, and Frank N. Simon, both of Bloomington, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed June 17, 1974, Ser. No. 479,925
Int. Cl.[2] G01N *11/16*
U.S. Cl. 73—54 28 Claims



1. A sensor for providing representations of fluid parameters involving fluid viscosity, fluid density and fluid sonic velocity, said sensor comprising:

an electrical transducer, having electrical terminals therein serving as input terminals, said transducer providing a transduction between energy types therein and said transducer, in effecting said transduction, has (a) first surfaces thereof placed in vibratory motion in directions in which they are capable of imparting shear wave energy to said fluid, and (b) second surfaces thereof placed in vibratory motion in directions in which they are capable of imparting longitudinal wave energy to said fluid;

wherein said transduction is effective between said input terminals and electrical terminals serving as output terminals, said transduction plus at least one other providing a voltage transformation such that said output indication is an output voltage signal provided between said output terminals;

oscillator circuitry means which provides an oscillating electrical signal at said input terminals; and

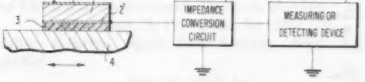
output sensing means which senses an output indication to provide at least one of said representations.

3,903,733

METHOD OF MEASURING VIBRATIONS BY MEANS OF PIEZOELECTRIC BODY AND THE APPARATUS THEREFOR

Naohiro Murayama, and Takao Oikawa, both of Iwaki, Japan, assignors to Kureha Kagaku Kogyo K.K., Tokyo, Japan

Filed Nov. 20, 1973, Ser. No. 417,676
Claims priority, application Japan, Nov. 20, 1972, 47-116328
Int. Cl. G01h *1/00*
U.S. Cl. 73—71.4 13 Claims



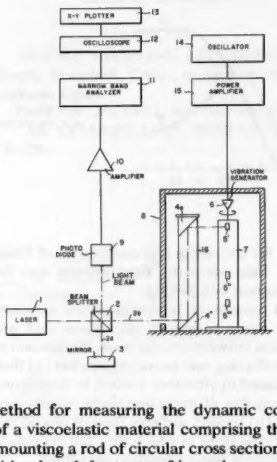
1. Apparatus for detecting vibrations comprising an electrically polarized high molecular polymer piezoelectric body subject to the vibrations and provided with electrodes on opposite sides thereof, said body converting the vibration to corresponding voltage variations between said electrodes, and detector means for detecting the voltage variations.

3,903,734

TECHNIQUE FOR MEASURING THE COMPLEX SHEAR MODULUS UTILIZING LASER INTERFEROMETRY

Bruce E. Douglas, Rt. 1, Box 575, Edgewater, Md. 21034

Filed Feb. 11, 1974, Ser. No. 441,535
Int. Cl.[2] G01N 3/32; G01M 7/00
U.S. Cl. 73—99 2 Claims



1. A method for measuring the dynamic complex shear modulus of a viscoelastic material comprising the steps of:

fixedly mounting a rod of circular cross section of the material with a length L at one of its ends;

maintaining the rod at a predetermined temperature;

introducing a sinusoidal torsional wave of a selected number of frequencies within a predetermined range of frequencies into the rod;

measuring the deflection, θL, of the rod at its free end, at a point midway its length $\theta L/2$, and at a point one quarter of the length of the rod from its fixed end, $\theta L/4$, for each of the selected frequencies;

A. for frequencies below the last maximum in $|R_4|$ determine the complex shear modulus G* for the given frequency f according to the following relationship

$$G^* = \frac{\pi^2 f^2 L^2 \rho}{(1+\beta^2)^{1/2}} \frac{\sin^2(1/2 \arctan \beta)}{[\cosh^{-1}(A'+A'')]^2} (1+i\beta)$$

where:

$$\beta = 2\left[\frac{\mathrm{Cos}^{-1}(A'-A'')+n\pi}{\cosh^{-1}(A'+A'')} - \frac{\cosh^{-1}(A'+A'')}{\mathrm{Cos}^{-1}(A'-A'')+n\pi}\right]$$

$$A' = \frac{1}{4|R_4|^2};$$

$$A'' = \frac{1}{4}\left(\frac{2}{|R_2|^2} + 8 - \frac{1}{|R_4|^4}\right)^{1/2}$$

$$|R_2| = \frac{\theta_{L/2}}{\theta_L};$$

$$|R_4| = \frac{\theta_{L/4}}{\theta_{L/2}};$$

ρ = mass density of the rod;

f = the frequency in Hertz; and

n = an integer selected at the given frequency f such that the absolute value of n equals the number of peaks in $|R_2|$ for the $|R_2|$ spectrum below frequency f and the sign of n is minus the sign of the slope of $|R_2|$ for values of f up to the last maximum in $|R_4|$ spectrum, i.e., the highest identifiable mode of vibration of the rod.

B. for frequencies above the last maximum in $|R_4|$ determine the dynamic complex shear modulus G* according to the following relationship:

$$G^* = \frac{C^2\rho}{(1+\beta^2)^{1/2}}(1+i\beta)$$

where;

$$\beta = \tan\left\{2 \arcsin\left[\frac{c}{\pi f L} \ln |R_3|\right]\right\};$$

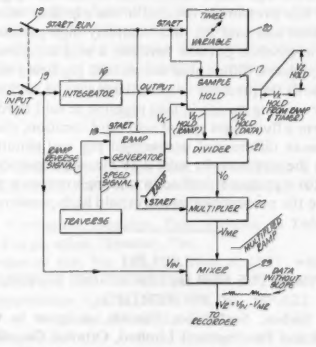
c = the velocity of the torsional wave through the material at frequency f.

3,903,735

SLOPE ERROR COMPENSATING APPARATUS FOR USE WITH PROFILE MEASURING EQUIPMENT

Gardner P. Wilson, El Monte, Calif., assignor to Gould Inc., Cleveland, Ohio

Filed Jan. 25, 1974, Ser. No. 436,527
Int. Cl.[2] G01B 5/28
U.S. Cl. 73—105 11 Claims



1. Circuit apparatus for treating a composite signal having high frequency data on a low frequency slope or drift to remove said slope or drift, comprising:

a low-pass filter having an input and an output;

a sample and hold circuit interconnected with said filter to receive the filtered signal therefrom as a first input;

a ramp generator interconnected to provide a second input to said sample and hold circuit;

a timer for providing a control signal to said sample and hold circuit for obtaining readout at the end of a predetermined time after actuation of said timer of first and second signals having values corresponding to the orthogonal components of the composite signal slope;

a switch selectively actuatable to simultaneously energize the ramp generator, the timer and the sample and hold circuit and to interconnect the low-pass filter circuit input with the composite signal;

means fed by said first and second output signals of said sample and hold circuit to provide a further signal corresponding to the ratio of said first and second signals;

means fed by the ratio signal and the ramp generator output to provide a further ramp signal of slope corresponding to the ramp generator output multiplied by said ratio signal; and

means interconnected with said further ramp signal and said composite signal for providing the difference thereof.

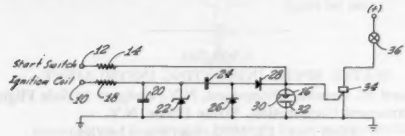
3,903,736
SERVICE COMPUTER USING ELECTROLYTIC CELL STORAGE MEMBER

Thomas B. Bissett, Malibu, and Martin S. Tatch, West Los Angeles, both of Calif., assignors to The Bissett-Berman Corporation, Los Angeles, Calif.

Continuation of Ser. No. 561,817, June 30, 1966, abandoned. This application Sept. 26, 1969, Ser. No. 861,518

Int. Cl. G01m *15/00*; **G04f** *9/00*

U.S. Cl. 73—117.3 **5 Claims**



1. A computer for determining a function of the wear imposed upon an engine rotatable at a variable speed, including:

first means responsive to the rotations of the engine for producing a first current output having variable characteristics in accordance with variations in the rotational speed of the engine;

second means responsive to the starting of the engine for producing a second current output having particular characteristics representing each start of the engine;

an electrolytic cell having first and second electrodes and with the first electrode constructed to store a particular material and with the first electrode disposed relative to the second electrode to transfer variable amounts of the particular material to the second electrode upon the introduction of the first and second current outputs to the second electrode and with the variable amount transferred in accordance with the variable characteristics of the first and second current outputs;

third means operatively coupled to the first means and the electrolytic cell for introducing the first current output from the first means to the electrolytic cell; and

fourth means operatively coupled to the second means and the storage member for introducing the second current output from the second means to the electrolytic cell.

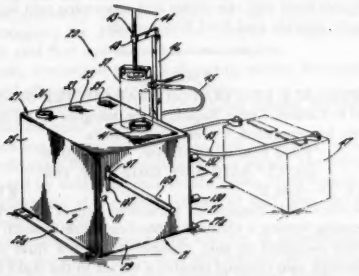
3,903,737
APPARATUS FOR TESTING STARTER MOTORS

Walter Burden, and James Mundo, both of Chicago, Ill., assignors to Burden Automotive Electric, Incorporated, Chicago, Ill.

Filed Mar. 20, 1974, Ser. No. 452,733

Int. Cl.² G01M *15/00*

U.S. Cl. 73—118 **5 Claims**



1. A starter test stand apparatus for testing performance characteristics of electric starter motors under presettable torque loads comprising a housing enclosure, a revoluble shaft mounted in the housing, a brake drum revolubly mounted on the shaft, a brake shoe with lining pivotably mounted within the housing for engagement with the brake drum, adjustable spring biasing means carried by the housing and including a spring device biasing the free end portion of the brake shoe in a direction toward the drum and rotatable bolt means for selectively compressing or releasing compression of the spring device thereby to set a predetermined fixed braking force on the drum, and separate positionable lever means carried by the housing and including an exteriorly exposed handle device, linkage means connected to the free end portion of the brake shoe and a pivotable lever arm interconnecting the same for translating movement of said handle device in a first direction into movement of said brake shoe against the brake drum and movement thereof in a second direction into movement of the brake shoe away from the brake drum whereby other braking forces can be applied against the brake drum without readjustment of the bolt means.

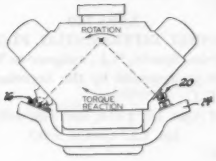
3,903,738
ROTATING MACHINERY TORQUE SENSING ARRANGEMENT

Gregory L. Malchow, Savoy, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed June 13, 1974, Ser. No. 478,842

Int. Cl.² G01L *3/02*

U.S. Cl. 73—136 R **2 Claims**



1. In a vehicle, a frame, an engine, a transmission rigidly secured to said engine, an engine-transmission mounting arrangement supporting said engine and transmission on said frame including one engine mount that resists engine torque in tension and another engine mount that resists engine torque in compression, and engine-transmission torque sensing means for replacing one of said engine mounts to provide engine-transmission torque measurements, said engine-transmission torque sensing means including a rigid link having a yoke at one end pivotably connected to said engine and a yoke at the other end pivotably connected to said frame whereby either compressive forces or tensile forces but not bending forces are produced in said link in reaction to engine torque, strain gauge means mounted on one of said yokes for sensing the torque reaction forces in said link, said one yoke having deflection characteristics to insure substantially linear force strain characteristics of substantial magnitude for the torque sensing obtained from said strain gauge means.

3,903,739
COMPENSATING DEVICE IN MAGNETOELASTIC TRANSDUCERS

Pavel Kolavcic, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Sept. 3, 1974, Ser. No. 502,726

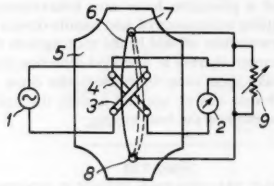
Claims priority, application Sweden, Sept. 13, 1973, 73124505

Int. Cl. G01l *1/12*

U.S. Cl. 73—141 A **4 Claims**

1. In a magnetoelastic transducer which consists essentially of an iron core with first apertures therein and winding means arranged in said first apertures for generating a magnetic field in the core and sensing the changes in the magnetic field which occur when the core is affected by a mechanical force, the core (5) being provided with second apertures (6,7) therein, located where the field strength is considerably lower

than around the apertures for the measuring winding means (4) and where the mechanical stress condition is dependent on the mechanical force, acting on the core, which is to be measured, at least one compensating winding in said second apertures, and means connected to said winding means and said compensating winding for adding the signal generated in



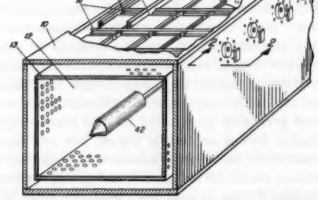
the compensating winding (6) and the signal generated in the winding means (4, 4*a*, 4*b*) which sense the alterations of the magnetic field; and said adding means including means operating in such a phase position of the signals that the hysteresis component of the compensating signal is in opposition to the hysteresis component of the winding means signal.

3,903,740

WIND TUNNEL DIFFERENTIAL FLOW FLAPS

Richard J. Baldwin, Sparta, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 10, 1974, Ser. No. 459,764
Int. Cl.[2] G01M *9/00*
U.S. Cl. 73—147 **1 Claim**



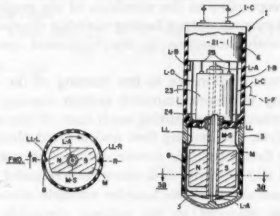
1. A transonic wind tunnel test section which comprises:
a tubular housing;
a tubularly shaped perforated member positioned within and supported sparedly from said housing; and
valve means, located between said housing and said perforated member, for selectively regulating the amount of air that flows into and out of said perforated member, said valve means creating substantially uniform pressure distribution across a test piece supported within said perforated member, said valve means includes:
a plurality of flaps positioned intermediate said housing and said perforated member for selectively covering said perforated member to control the flow of air therethrough;
a plurality of pivot rods positioned transversely across said test section and supported between said housing and said perforated member for rotatably supporting said flaps; and
flap adjusting means for positioning the degree of opening of said flaps which further includes;
a ratchet mounted near a first end of each of said pivot rods and located intermediate said housing and said perforated member;
a biased pawl supported by said housing which engages said ratchet and holds said ratchet in a fixed set position;
a knob mounted on said first end of said rod for rotating and locating the relative degree of opening of said flaps; and
lever means for releasing said pawl so that said flaps can be reset.

3,903,741

WATER SPEED INDICATING INSTRUMENT

Leonard M. Greene, Chappaqua, N.Y., assignor to Safe Flight Instrument Corporation, White Plains, N.Y.

Filed Nov. 12, 1973, Ser. No. 414,784
Int. Cl. G01c *21/10*
U.S. Cl. 73—181 **12 Claims**



1. A Faraday transducer adapted for mounting on a reference surface so as to generate signals representing the velocity of fluid flow past said surface comprising
a housing,
a permanent magnet rotatably mounted in said housing at a position therein between opposite ends thereof, the magnet poles being positioned on opposite sides of the magnet rotation axis,
means for rotatably driving said magnet to generate alternating magnetic flux out from the reference surface into the fluid flow and beyond the region of boundary layer and related surface effects,
a pair of detector electrodes spaced apart from each other, said electrodes being mounted in said housing along an extension of the magnet rotation axis on opposite ends of said magnet so as to bracket the magnetic flux, thereby conducting Faraday current signals, and
signal translation means for receiving said Faraday current signals from said electrodes and processing said signals so as to provide said fluid flow signals.

3,903,742

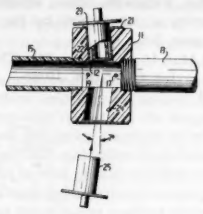
DISPOSABLE RESPIRATORY PARAMETER SENSOR

Russell F. Colton, Cedar Rapids, Iowa, assignor to J-Tec Associates, Incorporated, Cedar Rapids, Iowa

Filed Feb. 6, 1974, Ser. No. 440,056
Int. Cl.[2] A61B *5/08;* **G01F** *1/32, 1/66*
U.S. Cl. 73—194 B **8 Claims**

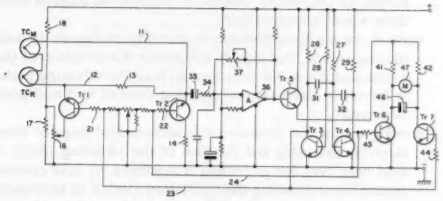
1. A disposable respiratory parameter sensor comprising:
a housing having a channel extending therethrough;
a strut mounted in said channel so that a fluid passing through said channel creates a vortex in the wake of said strut;
first and second side channels extending from the surface of said housing to intersect said channel extending through said housing, the axes of said side channels being directed toward the region where said vortex is created; and
a disposable flexible membrane material normally covering the ends of said side channels at the surface of said hous-

ing, said flexible membrane material being stretchable into said side channels whereby said channel extending



through said housing is isolated from contamination by any objects inserted into said side channels.

3,903,743
TEMPERATURE COMPENSATED THERMOMETER UTILIZING THERMOCOUPLES
Hans Gunter Noller, 201 Ellwood Dr., Raleigh, N.C. 27609
Filed Feb. 13, 1973, Ser. No. 332,107
Int. Cl.[2] G01K *7/12*
U.S. Cl. 73—361 **4 Claims**



1. Apparatus for measuring the temperature of an object, which comprises:

a first thermocouple, said thermocouple being positioned, in use, proximate the object whose temperature is to be measured;

a second thermocouple, substantially identical to said first thermocouple, serially connected with said first thermocouple but oppositely poled with respect thereto;

a multivibrator operating at a predetermined, fixed frequency;

first and second transistors, the emitters thereof being respectively connected to said first and second thermocouples and the bases thereof being respectively connected to oppositely phased outputs of said multivibrator for chopping the differential d.c. output voltage developed by said first and second thermocouples;

means, connected to said chopping means, for amplifying said chopped d.c. output voltage;

means, connected to said amplifying means, for rectifying said chopped d.c. output voltage;

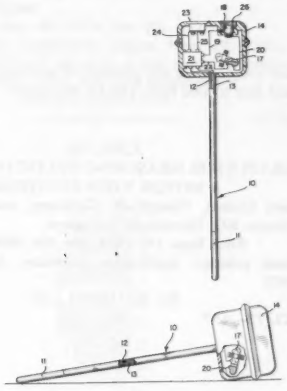
indicating means, connected to said rectifying means, for indicating the temperature of said object, the value indicated by said indicating means being proportional to the differential d.c. output voltage of said first and second thermocouples;

a temperature compensating resistor in substantially intimate thermal contact with said second thermocouple;

means for supplying a d.c. current to said resistor thereby to generate a voltage proportional to the instantaneous resistance thereof; and

means for supplying said voltage to said first and second transistors to alter the magnitude of the output signal therefrom, in an offsetting manner, if a change in the ambient temperature of said second thermocouple alters the differential d.c. output voltage from said first and second thermocouples.

3,903,744
ELECTRONIC THERMOMETER
Robert A. Cone, 599 River Rd., Piermont, N.Y. 10968
Filed July 18, 1973, Ser. No. 380,255
Int. Cl. G01k *7/24;* **H01h** *29/22*
U.S. Cl. 73—362 AR **4 Claims**



1. An electronic thermometer comprising:

a sensing head for measuring the ambient temperature;

power means;

an electronic analog to digital converter;

electronic digital read-out means;

position responsive switch means connected to said power means and to said analog to digital converter for establishing an electrical connection therebetween;

sealed housing for said power means, said analog to digital converter, said electric digital read-out means and said switch means;

said thermometer being maintainable in a substantially horizontal position and in a substantially vertical position, and said electrical connection being established for measuring the ambient temperature when the thermometer is maintained in one of said positions and being broken when said thermometer is maintained in the ohter of said positions.

3,903,745
GAS SAMPLER FOR COLLECTING AND MEASURING GASEOUS EMISSIONS FROM FLUES
Clark M. Bolser, P.O. Box 611, Le Mars, Iowa 51031
Filed Apr. 22, 1974, Ser. No. 463,100
Int. Cl.[2] G01N *1/22*
U.S. Cl. 73—421.5 A **17 Claims**

1. A gas sampler for collecting and measuring gaseous emissions from flues and the like, comprising,

a container,

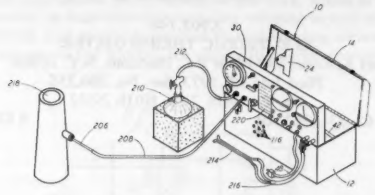
a vacuum pump positioned in said container,

a gas conducting means connecting said vacuum pump to a flue and to a sample flask,

a vacuum measuring means in communication with said gas conducting means, and

a selective control means interconnecting said vacuum pump and said gas conducting means whereby gas present in said flask and in said flue can be selectively purged, gas

from said flue can be selectively conveyed to said flask, and the pressure of said gas remaining in said flask after



said purging and the pressure of said gas conveyed from said flue to said flask can be measured.

3,903,746

APPARATUS FOR MEASURING STATIC IMBALANCE OF A MOTOR VEHICLE WHEEL

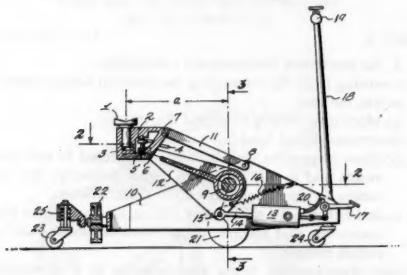
Eickhart Goebel, Pfungstadt, Germany, assignor to Gebr. Hofmann KG, Darmstadt, Germany

Filed Sept. 10, 1974, Ser. No. 504,985

Claims priority, application Germany, Sept. 12, 1973, 2345992

Int. Cl.[2] G01M *1/28*

U.S. Cl. 73—457 **14 Claims**



1. Apparatus for measuring static imbalance in a wheel mounted on a motor vehicle, comprising:

a base structure;

means for supporting the base structure on a surface on which in use the apparatus stands;

a lever assembly having first and second ends, the first end of the lever assembly being pivotally connected to the base structure;

a wheel support assembly, pivotally connected to the second end of the lever assembly, for engaging the mounting of the wheel and supporting the wheel in a raised condition;

force-measuring means operatively connected to the support assembly, for detecting static imbalance in the wheel; and

actuating means for causing pivotal movement of the lever assembly relative to the base structure, for raising said support assembly, whereby force applied to the support assembly by static imbalance in the wheel in the raised condition thereof is transmitted to said support surface by way of the forcemeasuring means, the lever assembly which is arrested relative to the base structure, and the base structure support means.

3,903,747

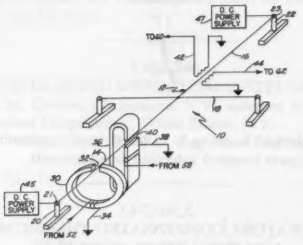
VIBRATING WIRE ATTITUDE REFERENCE SENSING SYSTEM

James H. Johnston, Rehoboth, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 16, 1974, Ser. No. 470,471

Int. Cl.[2] G01C *19/56*

U.S. Cl. 73—505 **7 Claims**



1. A vibrating wire attitude reference sensor comprising:

a wire;

driving means for driving said wire into a vibrating plane having an oscillatory motion of incremental angular rotations about a midposition;

control means for providing a plurality of signals to said driving means, said signals determine the direction of the incremental angular rotations so that the vibrating plane is forced to alternate on opposing sides of said mid-position; and

sensing means for detecting the incremental angular rotations by detecting the position of the vibrating plane of said wire and for providing a feedback to said control means for controlling the oscillatory motion of incremental angular rotations and therefore define said mid-position and for providing information to be counted for measuring angle.

3,903,748

APPARATUS FOR MOVEMENT OF A CYLINDRICAL BODY IN AXIAL DIRECTION

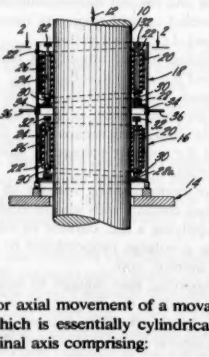
Harald Krogsrud, Gjettum, Norway, assignor to Elkem-Spigerverket A/S, Oslo, Norway

Filed Sept. 13, 1973, Ser. No. 396,893

Claims priority, application Norway, Sept. 14, 1972, 3269/72

Int. Cl. F16h *21/16*

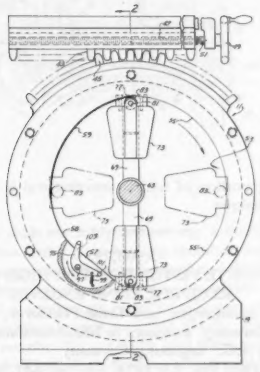
U.S. Cl. 74—25 **7 Claims**



1. Apparatus for axial movement of a movable member at least a part of which is essentially cylindrically shaped and having a longitudinal axis comprising:

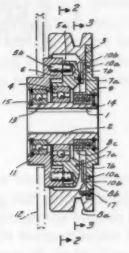
a. a rigid annular sleeve to be positioned about said cylindrical shape, said rigid annular sleeve having a longitudinal axis parallel to that of said movable member;
b. a resilient member interior of said sleeve and relatively immovable with respect to said sleeve;
c. a plurality of cylindrically shaped rollers interior of and in contact with said resilient member, said rollers being annularly arranged and spaced from each other, and being disposed on and bearing against a path having a helical gradient with respect to the longitudinal axis of said rigid sleeve and being disposed to bear against said cylindrical shape and said rollers each having a longitudinal axis parallel to that of said movable member; and
d. rotation of the rigid annular sleeve causing rotation of the roller members through the resilient member and movement of the rollers along the path having a helical gradient resulting in movement of the cylindrical member along its longitudinal axis.

3,903,749
POWER TRANSMISSION
Reinhold R. Kieper, 8761 Avis, Detroit, Mich. 48209
Filed Mar. 15, 1974, Ser. No. 451,477
Int. Cl. F16h *19/04*
U.S. Cl. 74—29 **2 Claims**



1. A power transmission comprising a base support;
a chambered cylindrical housing mounted on said support, having an end wall and a removable front plate with aligned apertures in said wall and plate on a horizontal axis;
a rotatable crankshaft axially disposed through said housing with portions of said crankshaft journalled and mounted on supports on the exterior and independent of said housing;
at least one pair of diametrically opposed piston rods on and projecting radially from said crankshaft within said housing;
a radially adjustable piston slidably and non-rotatively mounted on each rod yieldably biased outwardly;
cam rollers journalled upon said pistons on axes parallel to the housing axis;
said housing having a continuous arcuate cam bore operatively engaging said rollers;
said bore including a circular portion of maximum radius throughout 180° approximately; merging into a cam surface of reduced minimum dimension which merges into a circular portion of minimum radius for 90° approximately;
and a run out arcuate portion of 90° approximately starting from said minimum radius to said maximum radius; whereby one piston when traversing the bore of maximum radius has an increased leverage with respect to the other piston simultaneously traversing the cam portions and reduced radius portions of said bore;
the mountings of said pistons on said rods including a longitudinal spline therebetween.

3,903,750
SPEED REDUCTION MECHANISM
Isamu Takasu, Tokyo, Japan, assignor to Toyo Glass Machinery Co., Ltd., Japan
Filed Jan. 30, 1974, Ser. No. 437,786
Claims priority, application Japan, Nov. 18, 1972, 47-115243. The portion of the term of this patent subsequent to May 6, 1992, has been disclaimed.
Int. Cl. F16h *21/12*
U.S. Cl. 74—63 **5 Claims**

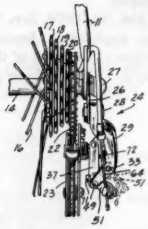


1. A speed changer comprising;
housing means defining a central axis;
an eccentric rotatable about said central axis at a first speed;
a disc mounted on said eccentric for rotation relative thereto but locked against rotation about said axis;
means for mounting the disc for circular movement in a closed path, on rotation of the eccentric;
a driven rotor mounted for rotation about said axis; and
means for converting circular movement of the disc into rotation of the driven rotor comprising means defining a first circle on said disc, a number of first lugs equally circumferentially spaced apart on said first circle, means defining a second circle on said driven rotor, one of said circles being disposed around the other, and a different number of second lugs equally circumferentially spaced apart on said second circle, the first and second lugs being positioned to bear approximately tangentially on one another individually and sequentially in response to circular motion of the disc and thereby to produce the rotation of the driven rotor at a speed different from said speed of the eccentric.

3,903,751
BICYCLE DERAILLER WITH OVERLOAD CABLE PROTECTION MEANS
Walter Dian, Downers Grove, Ill., assignor to Beatrice Foods Co., Elgin, Ill.
Filed Apr. 24, 1974, Ser. No. 463,677
Int. Cl. F16h *11/04*
U.S. Cl. 74—217 B **6 Claims**

1. A rear derailler mechanism for moving the drive chain of a bicycle having at least two sprocket wheels connected to the rear wheel comprising, a generally channel-shaped housing member attached to said bicycle adjacent the rear wheel, a parallelogram linkage mechanism comprising three links with two links having first ends pivotally connected to said channel-

shaped housing member and the third link with its opposite ends pivotally connected to the second ends of said two links, a chain engaging roller cage supported by said parallelogram, a control cable mounted on the bicycle and movable to at least two positions, an actuating link pivotally connected to said housing member, a first spring means connected between said



actuating link and said housing, and a second spring means connected between said actuating link and said parallelogram, wherein said first and second spring means allow said actuating link to move said parallelogram relative to said housing when said cable is moved unless the parallelogram is blocked, under which condition said actuating link moves against said first spring means as said parallelogram remains stationary.

3,903,752

RECIPROCATING MACHINE

Delmar R. Riffe, Murrysville, Pa., assignor to White-Westinghouse Corporation, Cleveland, Ohio

Filed Nov. 29, 1973, Ser. No. 420,334

Int. Cl. G05g *1/00*

U.S. Cl. 74—579 E **6 Claims**

1. In a reciprocating machine:

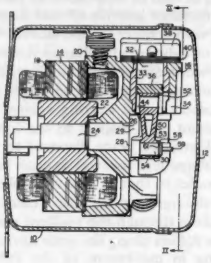
a shaft adapted to be rotated;

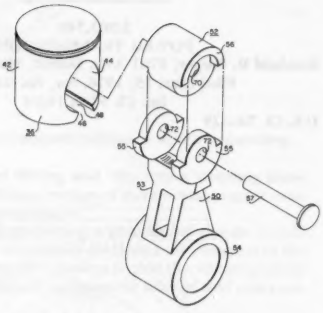
a crankpin attached to said shaft;

a cylinder, said cylinder being closed at one end, said cylinder having a sidewall depending from the closed end, said depending sidewall having a downwardly-open opening therein throughout the thickness of the sidewall;

a piston located in said cylinder, said piston being adapted for reciprocating movement in said cylinder, said piston having means for attaching said piston to a wrist pin, said piston being movable in said cylinder to position said means for attaching said piston to said wrist pin in alignment with said opening in said depending sidewall of said cylinder;

a connecting rod for connecting said crankpin to said piston, said connecting rod having an unbroken, closed loop, cylindrical bearing portion positioned on said crankpin and a wrist pin portion for attaching to said means on said piston said wrist pin portion of said connecting rod being movable through said opening in said depending sidewall of said cylinder to engage said means for attaching said piston to said wrist pin simultaneously as said cylindrical





bearing portion of said connecting rod is positioned on said crankpin.

3,903,753

COMPOSITE PISTON ROD FOR HIGH POWER RECIPROCATING ENGINES

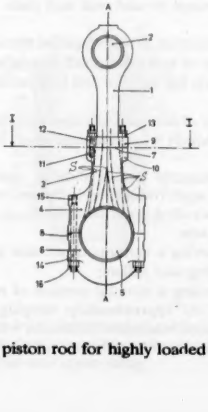
Adolf Ottl, Stadtbergen, and Ernst Pfleiderer, Konigsbrunn, both of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg A.G., Augsburg, Germany

Filed Feb. 12, 1974, Ser. No. 441,749

Claims priority, application Germany, Feb. 15, 1973, 2307348

Int. Cl. F16c *7/02*

U.S. Cl. 74—579 E **7 Claims**



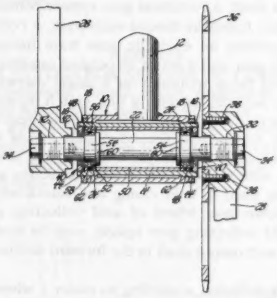
1. Composite piston rod for highly loaded pistons comprising

at least three composite parts (1, 3, 6), one of the parts (1) being formed with bearing means (2) for a piston pin;
the second and third parts (3, 6) being formed with portions of the bearing means (4, 5) for the crankshaft;
said first and second parts being formed at their junction with matching, fitting contact surfaces (7) located approximately in the middle between the axes of the piston pin bearing and the crankshaft bearing, and extending essentially transverse to the center line (A—A) passing through the bearing pin and the crankshaft;
and separable screw means (12, 13) surrounding the matching, fitting contact surfaces (7) and located circumferentially with respect to the first and second piston rod parts.

3,903,754
BICYCLE CRANK HUB ASSEMBLY

Pino D. Morroni, Warren, Mich., assignor to Pino International Ltd., Clawson, Mich.

Filed June 7, 1974, Ser. No. 477,200
Int. Cl.[2] B62M *3/00;* **F16C** *9/02*
U.S. Cl. 74—594.1 **35 Claims**



1. A crank shaft assembly comprising: a housing member, a shaft member within said housing member, bearing means for rotatably supporting said shaft member, said shaft member and bearing means being axially movable within said housing member over a continuous range of adjusted positions, and adjustable retaining means movable axially with respect to said housing member for retaining said shaft member in said housing member and for effecting adjustment of the axial position of said shaft member with respect to said housing member.

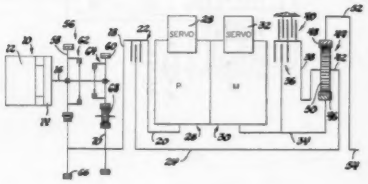
3,903,755
GAS TURBINE ENGINE AND HYDROMECHANICAL TRANSMISSION VEHICLE DRIVE

James C. Polak, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 381,045, July 20, 1973, abandoned. This application Dec. 10, 1973, Ser. No. 423,440
Int. Cl. F16h *47/04, 57/10*
U.S. Cl. 74—687 **4 Claims**

1. A power drive system for a vehicle comprising, a gas turbine engine having free turbine output means operable through a speed range for providing variable output torques and speed and having a maximum output torque at zero output speed; a variable ratio hydrostatic transmission including variable displacement pump means and motor means each having a maximum displacement and pressure limitation for limiting the torque transmission of said hydrostatic transmission at a value less than said maximum output torque of said free turbine output means; drive means disposed between said free turbine output means and said hydrostatic transmission for providing a drive relationship therebetween; transmission output means for delivering power from said drive system; planetary gear means including a sun gear drivingly connected with said hydrostatic transmission, a ring gear drivingly connected with said transmission output means, a carrier member, and pinion gear means rotatably mounted on said carrier member and meshing with said sun and ring gear; first selectively engageable clutch means for connecting said sun gear and said carrier member together; second selectively engageable clutch means for connecting said drive means and said carrier member together and cooperating with said first clutch means for providing a low speed drive range which transmits engine torque directly from said drive means to said transmission output means through a mechanical drive path only; and servo means for varying the displacement of said pump means for controlling said pump and motor displacements at equal values when both said clutch means are engaged and said pump means and motor means are rotated in unison when the mechanical drive path having a speed-torque characteristic substantially equal to the engine speed torque characteristic is provided and for varying the displacement of said pump relative to the displacement of said motor when said first clutch means is disengaged and said second clutch means is engaged to provide a hydromechanical high speed drive range defining a substantially continuous output speed-torque characteristic.

4. A variable speed power drive system for a vehicle comprising a free turbine gas turbine engine having free turbine output means for providing a power output therefrom through a speed range including zero output speed and a torque range

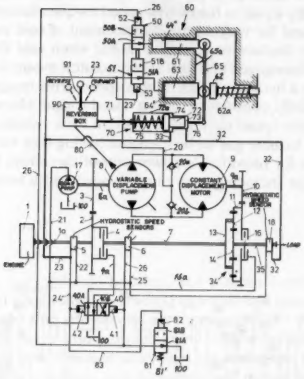


having a maximum torque at zero output speed; a hydromechanical transmission including a variable ratio hydrostatic transmission having a variable displacement pump, a variable displacement motor and means for controlling the displacement of each of said variable displacement pump and motor, forward-reverse drive means connected between said free turbine output means and said pump for selectively providing forward and reverse drives therebetween, planetary gear means including a sun gear, a ring gear, a carrier member and pinions rotatably mounted on said carrier member meshing with said sun and ring gears, drive means connected between said motor and said sun gear, first selectively engageable clutch means disposed between said forward-reverse drive means and said carrier member for providing a selective drive connection therebetween to establish a forward and a reverse low range mechanical drive in said system, second selectively engageable clutch means between said drive means and said carrier member cooperating with said first clutch means for providing a selective mechanical only drive connection therebetween when the low forward drive range is desired and said pump displacement is equal to the motor displacement, said second clutch means being disengaged and said first clutch means remaining engaged to provide a second and high forward and reverse drive range having a mechanical component from said free turbine output means and a hydrostatic component from said hydrostatic transmission; and output means continuously connected with said ring gear to deliver the drives from said hydromechanical transmission.

3,903,756
HYDROMECHANICAL TRANSMISSION

Karlmann Hamma, Tettnang, Germany, assignor to Zahnradfabrik Friedrichshafen Aktiengesellschaft, Friedrichshafen, Germany

Filed Feb. 14, 1974, Ser. No. 442,348
Claims priority, application Germany, Feb. 14, 1973, 2307100
Int. Cl.² F16H 47/04
U.S. Cl. 74—687 **10 Claims**



1. A hydromechanical transmission for driving a load from an engine having a predetermined range of operating speeds, comprising:

an input shaft coupled to said engine;

an output shaft coupled to said load;

a power train between said input and output shafts including a mechanical branch and a hydraulic branch;

a hydrostatic torque converter in said hydraulic branch including a variable-displacement pump and a constant-displacement motor in tandem therewith;

speed-sensing means in said power train;

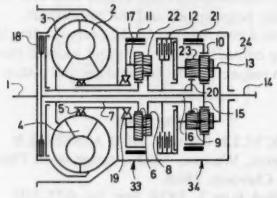
servo-control means for said pump connected to said speed-sensing means and to said torque converter for making the delivery rate of said pump per input-shaft revolution dependent on the output pressure of said pump and on the speeds of said shafts, said servo-control means having a first operating condition for varying said delivery rate directly with the speed of said input shaft and inversely with said output pressure and with the speed of said output shaft, said servo-control means further having a second operating condition for varying said delivery rate inversely with the speed of either of said shafts independently of said output pressure; and

switchover means in said power train responsive to said speed-sensing means for deactivating said mechanical branch at engine speeds below said range and for activating said mechanical branch at engine speeds within said range upon equalization of the speeds of said input and output shafts, said servo-control means being coupled to said switchover means for assuming said first operating condition in the deactivated state and said second operating condition in the activated state of said mechanical branch.

3,903,757
HYDRAULIC DIFFERENTIAL GEAR BOX

Antonin Hau; Jiri Frydrych, and Jiri Srubar, all of Prague, Czechoslovakia, assignors to Ustav pro vyzkum motorovych vozidel, Prague, Czechoslovakia

Filed Feb. 26, 1973, Ser. No. 335,732
Int. Cl. F16h 47/08, 47/00
U.S. Cl. 74—688 **6 Claims**



1. A hydraulic transmission comprising a casing, an input shaft, a hydraulic torque converter having an input connected to said input shaft, a reduction gear system connected to the output of said hydraulic torque converter, a collecting gear system comprising an epicyclic gear train having a crown wheel, a sun gear and a set of associated satellite gears, said satellite gears being mounted on a single carrier having an output shaft secured thereto, a first clutch means for selectively connecting said input shaft to the sun gear of said collecting gear system and second clutch means including a connecting shaft for selectively interengaging said reduction gear system with the sun gear of said collecting gear system, brake means fixed to said casing and selectively engagable with the crown gear wheel of said collecting gear system whereby said collecting gear system may be made to selectively drive said output shaft in the forward and reverse direction.

2. The transmission according to claim **1** wherein said reduction gear system comprises an epicyclic gear train having an input sun gear connected to the output of said torque converter and an output sun gear connect to said second clutch means, and including means for connecting the carrier of said collecting gear system to said second clutch, said second clutch being adapted to selectively connect said output sun gear with one of the sun gears and carrier of said collecting gear system.

5. The transmission according to claim **1** wherein the reduction gear system includes a pair of parallel differential gear drives, one of said gear drives being connected to the output of the hydraulic torque converter, the other of which is connected to the input shaft.

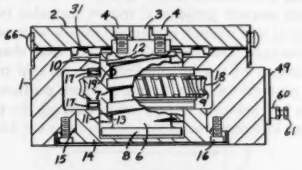
3,903,758
INDEX TABLE

Harold A. Keichel, 29679 Franklin Ave., Wickliffe, Ohio 44092

Filed May 7, 1973, Ser. No. 357,787
Int. Cl.² B23B 29/32
U.S. Cl. 74—826 **3 Claims**

1. In index table construction of the class described, in combination, a base, an index table plate supported thereby and rotatable with respect thereto, means on the plate and base to accurately position said plate in fixed relation with said base, and means to raise, rotate and lower said plate with respect to said base, including means to positively position the raised plate with respect to said base, and including actuating means to initiate and terminate said movements said means comprising a rotatable captive nut in the base, having a central thread portion therein, axial screw means extending through the nut, rigidly connected to the plate and directly operable upon rotation of the nut to move the plate upwardly, rotate the same and lower said plate in predetermined position as

determined by the positioning means in response to operation of the actuating means causing the initiation and termination of the aforesaid movements, whereby successive rotational increments thereof are precisely effected, a locater plunger is mounted in the base and includes a head for engagement with the positioning means when the plate has been rotated to its



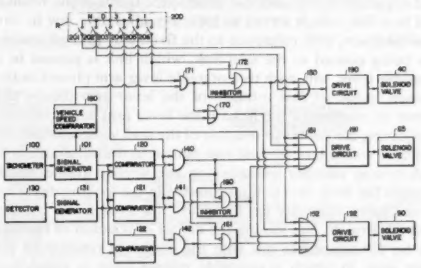
predetermined position, a latch to releasably engage said plunger means to maintain the same in position to move into such engagement, a latch arm connected to the latch to move the same and release the plunger means, and a striker member carried by the plate to engage the latch arm and thereby move the latch as stated.

3,903,759

CONTROL SYSTEM FOR AUTOMATIC TRANSMISSIONS

Masanao Hashimoto, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed July 25, 1973, Ser. No. 382,555
Claims priority, application Japan, July 28, 1972, 47-75043
Int. Cl. B60r *21/02;* **F16h** *57/10*
U.S. Cl. 74—866 **8 Claims**



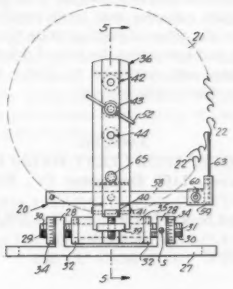
1. For a four-forward one-reverse automatic transmission wherein a gear transmission drives wheels in response to operation of a throttle and means including a plurality of hydraulic valves establish a drive ratio in the gear transmission, a control system comprising: means including three shift valves for supplying the hydraulic pressure and relieving the hydraulic pressure from the hydraulic valves according to a predetermined arrangement so that specific gear ratios occurs in response to operation of specific shift valves, first generating means selectively operable by an operator for generating electrical signals indicative of the condition in which the transmission is to operate, second generating means coupled to the throttle and the wheels for generating electrical signals representing an operating condition of the vehicle, logic means response to said first and second generating means for producing electrical values together indicating one of a number of gear shift positions for the transmission in response to the electrical signals from said two generating means, and driver means coupled to said logic means for responding to the electrical values and actuating said three shift valves so as to establish one of a number of specific gear ratios and forward and reverse directions, said first generating means including a plurality of contacts selectively closed by a driver in order to obtain one of six gear ranges; said six gear ranges including reverse gear, neutral, automatic drive range changeable from first to fourth gear, a fixed first gear, a fixed second gear, and a fixed third gear; said second generating means including sensor means coupled to the wheels for producing a signal indicative of the vehicle speed and detecting means responsive to the throttle for generating a signal representative of the load to be placed on the engine, said logic means including three comparators each coupled to said sensing means and said detector means for producing separate logic indications in response to the ratios of the signals applied to each comparator means, said ratios being different for each of the comparator means, said logic means including circuit means responsive to operation of the contacts and said three comparator means for generating the electrical values, said electrical values representing the range determined by the driver and the electrical signal representing the range automatically determined in response to said comparator means, and driving means including three solenoid valves responsive to said logic means, said solenoid valves being actuated in response to electrical values from said circuit means so as to actuate said shift valves.

3,903,760

CIRCULAR SAW SHARPENING DEVICE

Russell P. Jones, 6059 Bradshaw Rd., Sacramento, Calif. 95826

Filed June 19, 1974, Ser. No. 480,941
Int. Cl.² B23D *63/14*
U.S. Cl. 76—79 **3 Claims**

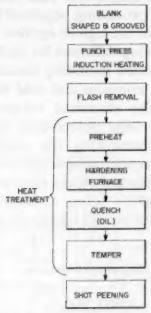


1. In a circular saw blade sharpening device, for use with a rotatable sharpening stone mounted on the vertical axis of and driven by a drill press, a generally horizontal base, a generally horizontal shaft mounted on said base, a body mounted for rotation on said shaft, means on said shaft for adjusting said shaft endwise with respect to said base, a fixture mounted on said body and having a fixed section and a second section pivotally mounted to said body by a pivot parallel to said shaft with said second section swingable toward and away from said fixed section for releasably clamping a circular saw blade therebetween, adjustable means on said body engagable with said base for limiting movement of said fixture about said shaft, means adjustably secured to said fixed section for directly engaging an individual tooth of the saw blade to be sharpened for indexing the saw teeth for grinding, means on said fixed and second sections for mounting a circular saw blade thereon and securing said second section to said fixed section.

3,903,761
PROCESS FOR THE MANUFACTURE OF DRIVER BITS

Leslie A. Runton, Canton, Mass., assignor to Phillips Screw Company, Natick, Mass.

Continuation of Ser. No. 184,599, Sept. 28, 1971, abandoned.
This application Nov. 27, 1973, Ser. No. 419,296
Int. Cl. B21k *21/00;* **B21c** *37/30*
U.S. Cl. 76—101 D **10 Claims**



1. A method for the manufacture of driver bits, comprising the steps of:

a. heating the end portion of a steel alloy blank to be formed into the head portion of the driver bit to substantially that temperature enabling said head portion to flow under pressure;

b. forging the head portion by impacting a forming die member into a holding die member containing the steel alloy blank whereby the grain contours of said alloy in said head portion substantially conform to the external configuration thereof and the grain contours of said alloy in the region adjacent said head portion substantially conform to the external configuration thereof;

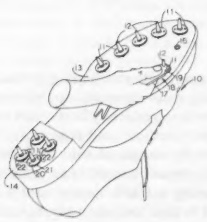
c. hardening and tempering the forged driver bit; and

d. shot-peening said driver bit to relieve stresses and to provide an elastic skin surface.

3,903,762
GOLF SHOE CLEAT WRENCH

Charles E. Acrea, 1109 Dunbarton Dr., Richardson, Tex. 75080

Filed Sept. 17, 1973, Ser. No. 398,007
Int. Cl. B25b *13/48*
U.S. Cl. 81—90 C **8 Claims**

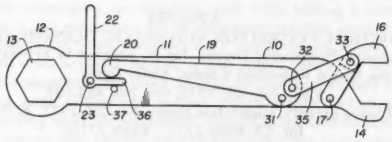


1. A wrench tool for installing and removing spiked shoe cleats threaded into the bottom of shoes, including: a wrench tool planar head end having a conical section opening conformably accepting the conically shaped spike of a shoe cleat to be wrench torqued into or out of the bottom of a shoe; a wrench tool shank body angularly extended at an acute angle through most of the length of the shank body, from said wrench tool planar head end for grasping and wrench torquing spiked shoe cleats, said wrench tool planar head end being generally normal to the axis of a shoe cleat with which said tool is operably engaged; knob-ended wrench projection means integrally formed with said tool head end projecting transverse of said tool head through opening means of a spiked shoe cleat and having knob end sloped cam surfaces catching under edges of said opening means when the wrench tool is used for wrench torquing a shoe cleat; wherein said knob-ended wrench projection means includes two wrench projections as said wrench projection means with each formed with an enlarged knob-end of generally oval shape in plan view transverse to the longitudinal axis of said projections; and, said projections each having a shank portion of similar oval shape in transverse cross-section through the projections and smaller in transverse cross-section than the knob ends.

3,903,763
HAND WRENCH

Jimmy R. Haight, Butler, Mo., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed June 21, 1974, Ser. No. 481,649
Int. Cl.² B25B *13/40*
U.S. Cl. 81—111 **1 Claim**



1. A wrench fitted with a fixed jaw and an adjustable jaw, said adjustable jaw pivotably joined to the frame of the wrench and to a link which serves to lock the adjustable jaw in one fixed position, with reference to the fixed jaw, said adjustable jaw being pinned to the said link, which link is pinned to a rotatable lever arm, with the rotatable lever arm pinned to the wrench frame so that rotation of the lever arm rotates the center of rotation of the link on the lever arm past a straight line joining the center of rotation of the said lever arm and the center of rotation of the said link pinned to the adjustable jaw, with a stop member mounted on the wrench frame which engages the lever arm to limit rotation in the locking direction of said lever arm after the lever arm has rotated the link pin past the straight line joining the center of rotation of the link pin on the adjustable jaw with the center of rotation of the lever arm, in which a pivotable release lever is positioned between the layer arm and the fixed stop, said release lever being pinned to the wrench frame, said release lever formed with a projecting handle section that extends free of the lever arm and the wrench frame in the engaged position of the release lever, the lever arm and the stop member, so that manual pressure may be exerted, in said engaged position, on the projecting handle section to rotate the release lever thus causing rotation of the lever arm away from the stop member in the unlocking direction.

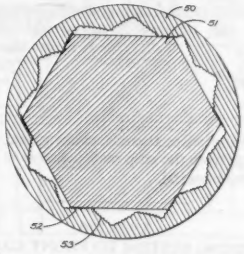
3,903,764
MINIMUM STRESSED WRENCH

Alfred Frederick Andersen, 2014 Los Angeles Ave., Berkeley, Calif. 94707

Filed Nov. 14, 1973, Ser. No. 415,781
Int. Cl.² B25B *13/06*
U.S. Cl. 81—121 R **6 Claims**

1. A wrench for turning a nut or bolt of regular polygonal shape, said wrench having a closed cavity of subsurfaces for engaging and turning said nut or bolt in either a clockwise or counterclockwise direction of rotation about the central axis of said regular polygonal shape, which subsurfaces are symmetrical with respect to said axis when engaging said nut in either direction of rotation, and at which times the engaging

subsurfaces of said cavity are all essentially parallel to said axis, and where during turning there are one or more sets of such subsurfaces employed exclusively in turning said nut in the clockwise direction and one or more sets employed exclusively in turning said nut in the counterclockwise direction of



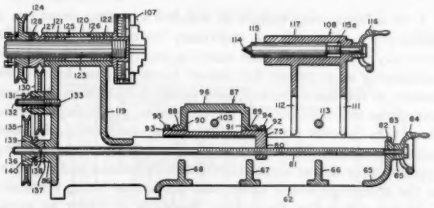
rotation, each such set having at least one pair of opposing subsurfaces, and where one or more of said subsurfaces are roughened to substantially increase the frictional resistance to slipping between such subsurfaces and the faces of a nut or bolt gripped by said subsurfaces.

3,903,765

SIMPLIFIED LATHE

Glenn B. Morse, 321 Fountain St. NE. Apt. No. 1, Grand Rapids, Mich. 49502

Filed Sept. 14, 1973, Ser. No. 397,396
Int. Cl. B23b *21/00*
U.S. Cl. 82—21 R **6 Claims**



1. A lathe including a frame having a guideway, a carriage movably mounted on said guideway, a spindle rotatably mounted in said frame on an axis parallel to said guideway, and a feed screw rotatably mounted in said frame on an axis parallel to said guideway, wherein the improvement comprises:

bearing means disposed at opposite ends of said frame and carrying said feed screw;

an integral extension of said feed screw and said spindle extending beyond said frame at one of said frame ends, said feed screw being in threaded engagement with a portion of said carriage assembly between spaced parallel guideway sections;

a thrust-transfer member removably secured to the opposite end of said feed screw from said extension exteriorly of said frame, said member being in axial thrust-bearing relationship to the end of said frame remote from said extension, the arrangement being such that said feed screw may be assembled into said frame by insertion axially into said frame from said remote end of said frame in the absence of said member; and

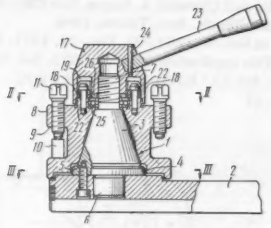
speed-reducing power-transfer means operatively associating said spindle and said feed screw extension.

3,903,766

MULTIHOLDER TOOL HEAD

Vitaly Teodorovich Dauge, ulitsa Malaya Naberezhnaya 7, kv. 20, and Kirill Vladimirovich Buznyakov, ulitsa Lesteva 20, kv. 12, both of Moscow, U.S.S.R.

Filed June 15, 1973, Ser. No. 370,469
Int. Cl. B23b *29/28*
U.S. Cl. 82—36 A **2 Claims**



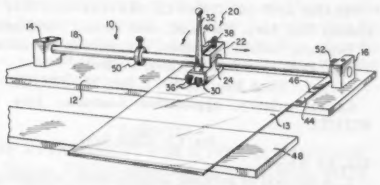
1. A multiholder tool head comprising: a cone-shaped base; a toolholder rotatably mounted on said base and adapted to be fixed thereto, said toolholder engaging the base over the conical surface thereof and being provided with a carrier for rotation thereof; a spring-loaded clamp essentially forming a body of rotation being adapted to lock said toolholder on said base in any predetermined position with respect thereto after having been rotated into this position, said clamp being provided with a socket made in one of the engaging parts to accommodate the clamp during the rotation of said toolholder, in the other of the engaging parts said clamp being provided with recesses equal in number to said predetermined positions for clamping the toolholder, said clamp projecting beyond the socket into one of said recesses, the path of movement of said clamp extending in a plane transverse with respect to the rotational axis of said toolholder and being directed along the chord of a circle of the cross-section of the base located in said plane; the socket accommodating the clamp during the rotation of the toolholder being made in the base and the recesses being made in the toolholder; said clamp comprising a cylindrical roller, the axis of said roller being in parallel with the rotational axis of the toolholder.

3,903,767

METHOD AND APPARATUS FOR CUTTING GLASS

Sam Kupersmith, 5305 Avenue D., Brooklyn, N.Y. 11203

Filed Jan. 23, 1975, Ser. No. 543,419
Int. Cl.² C03B *33/02*
U.S. Cl. 83—7 **11 Claims**



1. Apparatus for cutting a plate of glass with a cutter tool having a cutting edge comprising:

a horizontal surface for supporting a plate of glass;

a horizontally extending cylindrical bar being supported above said horizontal surface;

a carriage assembly including a block being slidably and rotatably mounted on said bar, means for loosely holding and for locking a cutting tool in said block, means for levelling the position of said block with respect to said bar

and means for locking said block in said levelled position to prevent said block from sliding and rotating movement with respect to said bar.

3,903,768

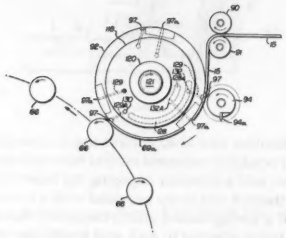
MACHINE FOR PRODUCING A PLASTIC-COVERED GLASS CONTAINER

Stephen W. Amberg, St. James; Thomas E. Doherty, Setauket, both of N.Y., and Clarence A. Heyne, Sun City, Ariz., assignors to Owens-Illinois, Inc., Toledo, Ohio

Division of Ser. No. 209,751, Dec. 20, 1971, Pat. No. 3,802,942. This application July 11, 1973, Ser. No. 378,218

Int. Cl.[2] B26D *7/06;* **B65H** *29/32*

U.S. Cl. 83—24 **6 Claims**



1. The method of feeding a web of flexible material and forming a predetermined discrete length therefrom comprising the steps of moving the web longitudinally in a linear path at a predetermined linear velocity, engaging the leading portion of the web with an arcuate surface and yieldably holding the leading portion thereon by locally applying a first vacuum at the arcuate surface interface, moving said arcuate surface in a rotary path at a velocity in excess of said linear velocity of the web, said leading portion slipping on said moving arcuate surface while pulling the web and maintaining it taut and wrapping a portion of the web on said arcuate surface, applying a second vacuum force to the web aft of said leading portion, said first interfacially applied vacuum moving with the arcuate surface relative to the leading edge of the web until disconnected from the web, whereupon performing the step of severing the web transversely at a point thereof on said arcuate surface and thereby forming a discrete severed length of material, and holding said severed length on said arcuate surface by said second vacuum for advancing said severed length in registered position on said moving arcuate surface.

3,903,769

MEANS AND METHOD OF SLOTTING STRIP METAL

Harold Rex Jury, Norwood, and Ronald McKenzie Howells, Yennora, both of Australia, assignors to Comalco (J. & S.) Pty., Ltd., New South Wales, Australia

Filed July 13, 1973, Ser. No. 378,833

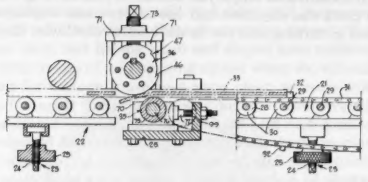
Claims priority, application Australia, July 17, 1972, 9721/72

Int. Cl. B26d *3/00*

U.S. Cl. 83—37 **16 Claims**

1. A method of forming longitudinally extending slots in a non-flexible strip material having a constant cross-sectional shape, the slotted strip material to be expanded by drawing edges thereof apart, comprising:

driving the strip in the direction of its longitudinal axis and at right angles to the axis of a series of co-axial slotting rollers and through a cutting zone existing between the rollers and back-up means, each of said slotting rollers having at least one radial projection extending around it for part but not all of its circumference and terminating in curved surfaces which extend in radial directions, and simultaneously driving the slotting rollers rotationally to have their pitch cutting speed less than the speed of



travel of the strip, thereby causing said projections to shear slugs from the strip material so as to form said slots in the strip material.

3,903,770

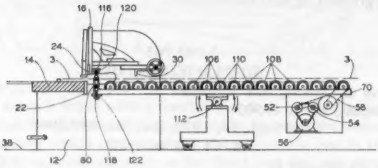
SHEAR FEEDING SYSTEM TO FRONT GAUGES USING MAGNETIC DELIVERY MEANS AND A VERTICALLY YIELDING SUPPORT TABLE

Alexander Fowler, and Joseph M. Fowler, both of 334 Westover Rd. P.O. Box No. 384, Stamford, Conn. 06902

Filed Nov. 15, 1973, Ser. No. 415,935

Int. Cl. B23d *15/08, 33/02*

U.S. Cl. 83—71 **8 Claims**



1. In a fabricating system in which a squaring shear has a stationary bed carrying a stationary lower knife and has a vertically reciprocative ram carrying an upper knife and has positioning stop means for sheets located close to a work station at the front thereof, said positioning means disposed transverse to a feed path for sheets, and in which the squaring shear acts to sever positioned sheets disposed along said feed path, the combination with said squaring shear, of feeding apparatus for sheets located immediately behind and adjacent to the stationary lower knife, said apparatus being vertically yieldable when the shear ram descends in order to avoid interference with ram operation, in which the mass of said vertically yieldable apparatus is counterbalanced around a pivoted support located behind the stationary lower knife, said apparatus including power operated driving means conjoined with magnetic sheet holding means to move a sheet along said feed path away from said positioning means, electrical control means for determining limits of sheet movement away from said positioning means, and means for reversing said driving means automatically after completion of a preset number of shearing cycles to return a sheet along said path to said positioning means.

3,903,771

APPARATUS FOR EDGING AND RESAWING LUMBER

Rene Fritz, and Rene Eugene Fritz, both of Albany, Oreg., assignors to Albany International Industries, Inc., Albany, Oreg.

Division of Ser. No. 885,389, Dec. 15, 1969. This application Jan. 21, 1972, Ser. No. 219,642

Int. Cl. B27b *15/04, 31/08, 31/06*

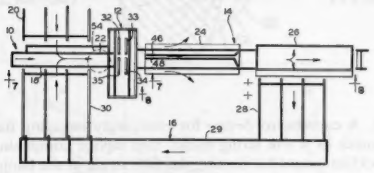
U.S. Cl. 83—102.1 **12 Claims**

1. An edger-resaw apparatus for processing logs into lumber comprising in combination:

a saw section including multiple vertical band saws,

means for changing the transverse spacing between said saws so that boards of different thicknesses can be produced by said saws and for repositioning said saws so that less than all of said saws can be used during a sawing cycle and so that said saws can be used for both edging and resawing material,

an infeed section including means for orienting and feeding elongated material in a straight path longitudinally through said saw section,



an outfeed section for receiving cut material from said saw section including means for separating edge trimmings from said cut material and means for directing said cut material selectively in at least two different directions downstream of said saw section,

and recirculating means for receiving cut material including boards from said outfeed section directed in one of said two directions and recirculating said cut material including boards back to said infeed section for further processing through said saw section.

3,903,772

SHEET MATERIAL CUTTING MACHINES

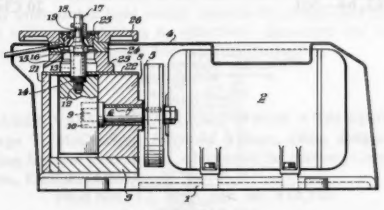
Charles F. Wickens, 14 The Broadway, Lancing, England

Filed June 11, 1973, Ser. No. 368,933

Claims priority, application United Kingdom, June 20, 1972, 28701/72

Int. Cl. B23d *27/00*

U.S. Cl. 83—146 **7 Claims**



1. A sheet material cutting machine including a work table, a die in said work table with its upper face substantially flush with the upper table surface, a cutting tool mounted in a tool holder located below said table surface, a tubular member disposed below said table surface for rigidly securing said cutting tool in said tool holder and being threadedly engaged therewith, driving means for reciprocating said tool holder and said tool along an axis perpendicular to said table surface so that a cutting edge on said tool approaches said die from above during the down stroke of the tool, and stripping means secured against movement along said axis of reciprocation and serving to inhibit upward movement of a workpiece during the upward stroke of the tool, said stripping means being integral with said die, said die and said stripping means being both annular, the two annuli being spaced apart and joined by a relatively narrow neck, the unitary structure constituting said die and said stripping means being rotatable in a die holder fixed with respect to said table about a common axis of said two annuli, the mounting arrangement being such that said unitary structure cannot move along said axis.

3,903,773

APPARATUS FOR AUTOMATICALLY DISPENSING PACKED PHARMACEUTICALS

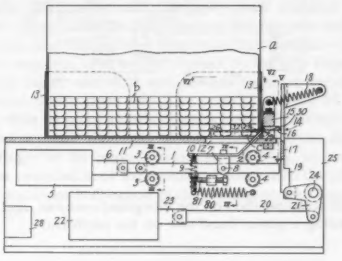
Mitsuo Furukawa, Sakai, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Nov. 5, 1973, Ser. No. 412,640

Claims priority, application Japan, Nov. 8, 1972, 47-112321

Int. Cl.[2] B26D *5/34; 5/65G 59/06*

U.S. Cl. 83—208 **20 Claims**



1. An apparatus for automatically dispensing blister packs which comprises a base plate supporting in position thereon a blister pack strip container holding therein blister pack strips, said base plate being provided with a slot; a discharging member for advancing a strip of blister packs one after another, the distal end of said discharging member extending upward through said slot; said strips of blister packs each having a relatively smooth surface on one side and a plurality of projections which serve as compartments for pharmaceutical articles and are axially arranged at substantially equal spacings on the opposite side, said strips of blister packs being stacked in said container with the projections face down and with the relatively smooth surfaces face up, said container having at the bottom thereof an opening which communicates with the slot of the base plate when said container is set in position on said base plate, said container further having a blister pack exit in communication with said opening, said exit being provided so as to be located in the path of movement of the discharging member when said container is set in position on said base plate; means for moving said discharging member repeatedly a specified distance back and forth; means for effecting engagement of said discharging member in its forward travel with one of said projections of a blister pack strip to advance the lowermost blister pack strip a predetermined amount and for preventing in its backward travel past the projections of blister pack strip any arresting or retracting of the strip of blister packs by said discharging member; cutter means for cutting off the leading portion of the strip of blister packs discharged from said container; and means for controlling the cutter means to bring the cutter edge into operation when the cumulative amount of movement of the discharging member has reached a predetermined value.

3,903,774

CUT-OFF ATTACHMENT FOR A POWER HAND SAW

Robert J. Stinson, 27620 Godard Rd., Romulus, Mich. 48174

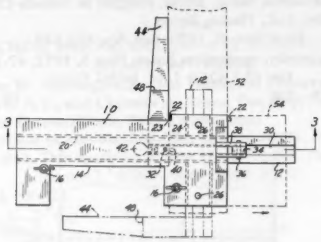
Filed Jan. 4, 1974, Ser. No. 430,886

Int. Cl. B27b *9/04, 5/18*

U.S. Cl. 83—471.2 **6 Claims**

1. An attachment for power hand saws comprising an elongated member having therein an upwardly disposed longitudinal channel, a platform slidably mounted on the elongated member and having thereon a retracted position, a lateral locator bar on the elongated member extending below the lower surface thereof for positioning the attachment on a work piece, a coiled spring rotatably supported on the platform having the outer end thereof located in the upwardly

disposed longitudinal channel and connected to the elongated member, such coiled spring yieldably holding the platform in



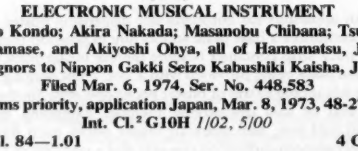
its retracted position on the elongated member, and means for mounting a power hand saw on the platform.

3,903,775

ELECTRONIC MUSICAL INSTRUMENT

Michio Kondo; Akira Nakada; Masanobu Chibana; Tsuyoshi Futamase, and Akiyoshi Ohya, all of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Mar. 6, 1974, Ser. No. 448,583
Claims priority, application Japan, Mar. 8, 1973, 48-27516
Int. Cl.[2] G10H *1/02, 5/00*
U.S. Cl. 84—1.01 4 Claims



1. An electronic musical instrument for producing an electrical musical tone signal comprising:

a. a plurality of tone color memories, each storing a waveshape of a particular tone color in analog representation at plural sample points;

b. a plurality of tone lever switches, each being provided for determining the level of a corresponding tone color waveshape;

c. means for reading sequentially the waveshapes from the tone color memories at said levels for the respective tone color waveshapes;

d. means for accumulating waveshape samples of the respective tone colors at each sample point;

e. a waveshape analog memory for storing the accumulated waveshape samples at each sample point of the analog memory and shifting cyclically the accumulated samples;

f. a claim address generator for generating claim addresses which change at a rate related to the frequency of a tone to be generated; and

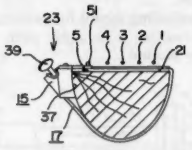
g. means for reading from said analog memory those samples among the stored accumulated samples that are designated by said claim addresses.

3,903,776

BANJO CAPODASTRO

Sterling W. Owen, III, Rt. 1, Box 96, Tunica, Miss. 38675

Filed Dec. 6, 1974, Ser. No. 530,134
Int. Cl.[2] G10D *3/00*
U.S. Cl. 84—318 8 Claims



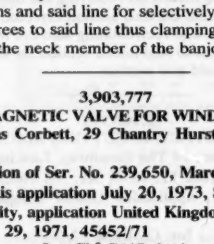
1. A capodastro device for clampingly engaging the neck member of a five string banjo, said device comprising rigid blocklike means for fretting the fifth string of the banjo while the remaining four strings thereof remain unaffected thereby, a length of line for circumferentially engaging the neck member of the banjo to aid in holding said rigid blocklike means in a selected one of numerous positions with one end of said line being attached to said blocklike means and a mid-portion thereof extending a spaced distance beneath the remaining four strings, and adjustment means coacting with said rigid blocklike means and said line for selectively applying tension in varying degrees to said line thus clamping said rigid blocklike means to the neck member of the banjo.

3,903,777

ELECTROMAGNETIC VALVE FOR WIND-PIPE ORGANS

George Douglas Corbett, 29 Chantry Hurst, Epson, Surrey, England

Continuation of Ser. No. 239,650, March 30, 1972, abandoned. This application July 20, 1973, Ser. No. 381,084
Claims priority, application United Kingdom, Apr. 7, 1971, 8999/71; Sept. 29, 1971, 45452/71
Int. Cl.[2] G10B *3/10*
U.S. Cl. 84—341 20 Claims



1. An electromagnetic pallet operator suitable for the substantially noise-less operation of a pallet valve of a wind pipe organ, the operator comprising a magnetically-open-ended first solenoid without dead stop, comprised of a first winding and a first armature of magnetic material, said first armature being coupled to said pallet and mounted within a cylinder for displacement on a path relative to the winding so that energisation of said winding will displace said armature along said path towards a condition of minimum reluctance and an air damping means to damp said first armature to an extent reducing pallet acceleration on opening of a pallet valve and preventing bounce on return of the pallet to its seating, said air damping means including a second solenoid comprising a second winding and second armature and a bleed opening, said second armature mounted for displacement into the said second winding and at least pardy closing said bleed opening when unenergised and opening said bleed opening when

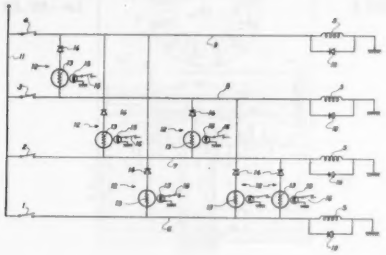
energised to produce a lower damping effect than when said second solenoid is without said energisation.

3,903,778

COUPLING AND ACTUATION CIRCUIT FOR A MULTI-EYBOARD INSTRUMENT

Werner Ferch, Fabreville, Canada, assignor to Casavant Freres Limited, St. Hyacinthe, Canada

Filed Aug. 27, 1974, Ser. No. 500,950
Int. Cl.[2] G10B *3/10*
U.S. Cl. 84—341 **13 Claims**



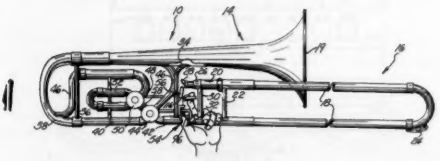
1. An electrical circuit for actuation of a keyboard instrument having at least two sets of playing keys, comprising actuation switches associated with said playing keys respectively and selectively closed by actuation of the corresponding playing key, electrical actuators associated with said playing keys respectively for actuating the associated sound-producing means of said instrument, electrical links connecting said electrical actuators to said actuation switches of said playing keys respectively,, electrical couplings joining said electrical links in pairs from one set to another set of said playing keys and each including a light responsive device connected in circuit therein for controlled coupling and uncoupling between the electrical links of the corresponding pair, and selectively energizable light means operatively juxtaposed to said light responsive devices to selectively illuminate the latter, whereby to produce the corresponding coupling.

3,903,779

DOUBLE VALVE ARRANGEMENT FOR A TROMBONE

George T. McCracken, Mayfield Village, Ohio, assignor to King Musical Instruments, division of the Seeburg Corporation, Eastlake, Ohio

Filed Nov. 12, 1973, Ser. No. 414,718
Int. Cl.[2] G01D *7/10*
U.S. Cl. 84—395 **15 Claims**



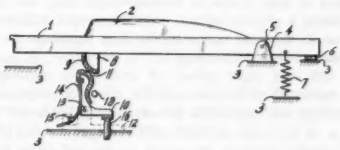
1. A double valve arrangement for a trombone including a movable slide member and a stationary slide member having first and second parallel portions, the first of which is connectable to the bell portion of the trombone and the second of which is connectable with the mouthpiece of the trombone and both of which are adapted to guide the movable slide member, said double valve arrangement comprising first and second valve means each having first and second positions for controlling the flow of sound through the trombone, a first linkage assembly adapted to be actuated by the thumb of the player's hand for actuating said first valve means and a second linkage assembly adapted to be actuated by the first finger of the player's hand for actuating said second valve means, said first linkage assembly including a first actuator member spaced apart from said first parallel portion of said stationary slide member and adapted to engage with the thumb of the player's hand to rotate toward said first parallel portion of said stationary slide member in response to actuation thereof by the thumb of the player's hand, said second linkage assembly including a second actuator member spaced apart from said first parallel portion of said stationary slide member and adapted to engage with the first finger of the player's hand to rotate toward said first parallel portion of said stationary slide member in response to actuation thereof by the first finger of the player's hand, said first and second actuator members being spaced apart from said first parallel portion of said stationary slide member a distance sufficient to allow said first and second actuator members to cooperate with the thumb and first finger of the player's hand, respectively, to control the angular orientation of the trombone relative to the player when the trombone is disposed in the playing position relative to the player.

3,903,780

KEYBOARD FOR MUSICAL INSTRUMENTS WITH INERTIAL EFFECT OF THE KEYS

Lucio Mario Aliprandi, Aspio Terme di Camerano, Italy, assignor to Farfisa S.p.A., Aspio Terme di Camerano, Italy

Filed May 29, 1974, Ser. No. 474,261
Int. Cl. G10c *3/12*
U.S. Cl. 84—433 **12 Claims**



1. A mechanical system for piano-like musical instruments having a keyboard including a plurality of independently movable keys that are pivotably mounted on and resiliently biased with respect to a rigid support, said system comprising, in combination:

a. an appendix secured to and extending downwardly from the underside of each of the keys for movement together therewith upon the depression of a selected key;

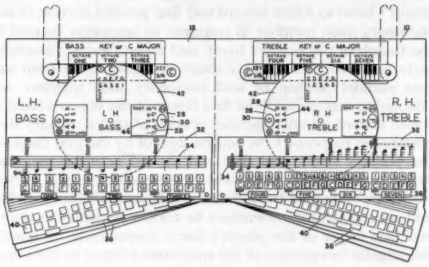
b. a plurality of levers equal in number to said appendices and pivotly mounted on the rigid support, each said lever being associated with and normally positioned in opposition to one of said appendices whereby, when any key is depressed, said appendix secured thereto will first engage said associated lever with a stroke contact and then with a sliding contact to thereby simulate the "feel" of a conventional piano key; and

c. means for selectively displacing said levers from their normal position whereby, when any key is depressed, there will be no contact between said appendix secured thereto and said associated lever so that the "feel" of a conventional piano key will not be present.

3,903,781
KEYBOARD PROGRESSION TEACHING AID

Verna M. Leonard, 6351 N. Blackstone, Fresno, Calif. 93721

Filed Feb. 22, 1974, Ser. No. 444,896
Int. Cl.[2] G09B *15/02*
U.S. Cl. 84—471 3 Claims



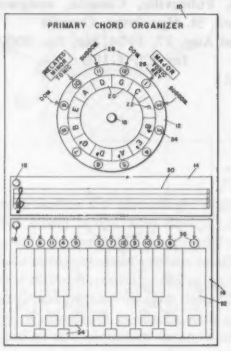
1. A keyboard progression teaching aid comprising:
a substantially rigid rear panel;
two groups of selectively displayable strips mounted respectively on the left hand and right hand sides of an upper portion of said panel, each of the strips of the left one of said groups bearing a representation of the three leftmost octaves on a keyboard and each of the strips of the right one of said groups bearing a representation of four octaves of the keyboard adjoining said leftmost octaves;
each of said strips having the octaves represented thereon being numbered consecutively and having indicia thereon identifying the scale tone associated with the first key of each octave represented thereon;
a pair of discs rotatably mounted on said rear panel each being substantially below one of said strip groups and having in peripherally arranged segments a plurality of arrays of indicia;
each of said arrays of indicia comprising the names of at least a portion of the scale tones of a different diatonic scale and the name of the key signature to which the diatonic scale belongs;
a left and right group of selectively exposable panels mounted on a lower portion of said rear panel;
each of said exposable panels having displayed thereon
a. at least one musical staff having the notes of a diatonic scale thereon, the notes on the left strips being in the bass clef and the notes on the right strips being in the treble cleff;
b. indicia denoting the key signature associated with the scale, and
c. indicia indicating to which of the consecutively numbered octaves of the keyboard represented on the appropriate strip the scale belongs,
whereby upon rotation of either of the discs and selection of a particular segment thereon, and selection of a strip from each group bearing an appropriate keyboard representation, a student can learn to associated different scale progressions with an instrument keyboard.

3,903,782
PRIMARY CHORD ORGANIZER

Verna M. Leonard, 8701 Highway 41, Fresno, Calif. 93710

Filed July 24, 1974, Ser. No. 491,252
Int. Cl.[2] G09B *15/00*
U.S. Cl. 84—471 3 Claims

1. A primary chord organizing aid comprising:
a. a substantially rigid backing sheet;
b. a disc mounted for rotational adjustment on an upper portion of said backing sheet and having twelve consecutive sectors, the names of the scale tones of the musical cycle of fourths being individually displayed in order in successive one of said sectors, said scale tone names being numbered in the order of the cycle of fourths;
c. indicia on said backing sheet adjacent said disc and registerable with any selected one of said sectors to identify the scale tone named thereon as the key;

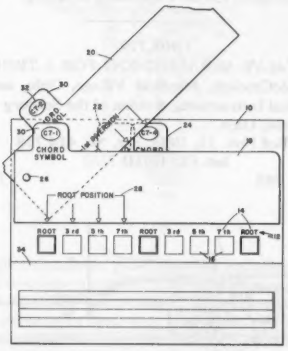


d. further indicia on said backing sheet adjacent said disc and identifying by juxtaposition with the sectors of said disc the related major and minor chords in said key; and
e. at least one panel mounted on a lower portion of said backing sheet, and displaying a keyboard with the individual keys numbered corresponding to numbering of the scale tones named on said dial.

3,903,783
INVERSION STRUCTURE INDICATOR

Verna M. Leonard, 8701 Highway 41, Fresno, Calif. 93710

Filed July 24, 1974, Ser. No. 491,255
Int. Cl.[2] G09B *15/02*
U.S. Cl. 84—471 5 Claims



1. A chord inversion structure teaching aid comprising:
a. a planer base;
b. said base having displayed thereon a plurality of uniformly spaced indicia extended in a lateral row and identifying the scale tones of a particular chord in two octaves;
c. a plurality of selectively exposable panels pivotally mounted on said base and pivotal into registration with said row, each of said panels having thereon indicia indi-

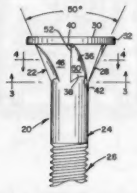
cating by juxtaposition when so pivoted which ones of said identified scale tones comprise the scale tones of a particular inversion of said particular chord and identifying said particular inversion.

3,903,784

SELF-COUNTERSINKING FASTENER HEAD

Charles Dekker, St. Charles, Ill., assignor to Anchor Bolt and Screw Company, Chicago, Ill.

Filed Jan. 3, 1972, Ser. No. 215,071
Int. Cl.[2] F16B *25/00*
U.S. Cl. 85—43 2 Claims



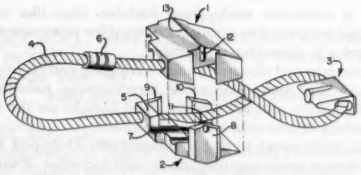
1. A self-countersinking threaded fastener comprising:
a threaded elongated body portion with screw threads sloping in a first direction;
a head portion including a tapered underside having an included angle between 45° and 55°, and four uniformly spaced cutter edges sloping in the direction opposite said first direction, and a recess below each of said cutter edges having a shape such that respective imaginary lines extending axially downwardly from every point on said recess encounter no other portion of said fastener, and driving means comprising a recess in the top of said head portion having four radially extending portions extending into said head portion to respective ones of those regions of the tapered underside of the head which are positioned between said cutting edges.

3,903,785

ROCK CLIMBING ANCHOR

William Pepper, Jr., 9839 Singleton Dr., Bethesda, Md. 20034

Filed June 24, 1974, Ser. No. 482,158
Int. Cl.[2] F16B *2/14*
U.S. Cl. 85—79 7 Claims



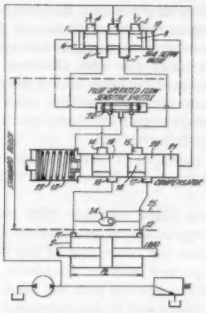
1. A rock anchor consisting of an inner wedge-shaped expander, two separate outer parts each having an inclined surface for mating cooperation with said expander therebetween, and a cable that transmits the load to said expander, said expander and outer parts being retained and carried by said cable.

3,903,786

HYDRAULIC SYSTEMS

Ronald Bernard Walters, Wembley, England, assignor to Sperry Rand Limited, London, England

Filed May 6, 1974, Ser. No. 467,082
Claims priority, application United Kingdom, May 15, 1974, 22950/74
Int. Cl.[2] F15B *11/08*
U.S. Cl. 91—444 5 Claims



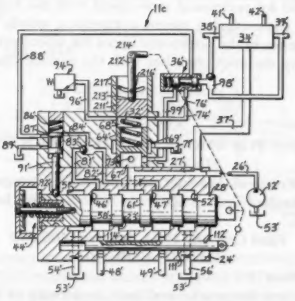
1. A hydraulic system including a source of hydraulic pressure, a load, a four-way control valve arranged to control the supply of hydraulic pressure to said load, said valve having a pair of service ports, a pair of service lines connecting said service ports to said load, a compensator being connected in at least one of said service lines and being arranged to restrict the flow of hydraulic fluid in said service line so as to maintain a constant pressure difference between said source pressure and said pressure at that one of the valve service ports that supplies fluid to said load.

3,903,787

LOW-EFFORT PROPORTIONAL CONTROL VALVE

Neil W. Kroth; Kenneth R. Lohbauer, and James E. Scheidt, all of Joliet, Ill., assignors to Caterpillar Tractor Company, Peoria, Ill.

Division of Ser. No. 211,333, Dec. 23, 1971, Pat. No. 3,847,180. This application Apr. 24, 1974, Ser. No. 463,561
Int. Cl. F15b *11/08*
U.S. Cl. 91—462 9 Claims



1. A fluid control circuit for regulating operation of a double-acting hydraulic motor and including a source of fluid under pressure and a control valve body defining a bore, an inlet chamber being in communication with the bore and the source, service chambers being respectively in communication with the control valve bore in axially spaced apart relation on opposite sides of the inlet chamber, drain means also being

in communication with the control valve bore and a spool reciprocably arranged in the control valve bore and having a neutral position wherein the spool blocks the inlet chamber from communication with both service chambers, the spool being movable in opposite directions from its neutral position for respectively communicating the inlet chambers with the service chambers and drain means, and comprising

a dump valve forming a bore having one end in free communication with the inlet chamber, a dump spool being movably arranged in the dump valve bore for separating its one end from its other end, the dump valve bore having an opening in communication with drain, the dump spool being movable toward the one end of the dump valve bore to block the inlet chamber from the drain opening and toward the other end of the dump valve bore to communicate the inlet chamber with the drain opening, spring means urging the dump spool toward the one end of the dump valve bore,

means forming passages in communication with the other end of the dump valve bore, the service chambers and drain,

regulating means being movable with the control valve spool and in regulating communication with the passages to communicate the other end of the dump valve bore with the respective service chambers when they are placed in communication with the inlet chamber by the control valve spool and to communicate the other end of the dump valve bore with drain when the control valve spool is in its neutral position,

the control valve spool being movable in opposite directions from its neutral position to provide substantially free communication between the inlet chamber and the respective service chambers, metering means being movable with the control valve spool to provide a variable opening between the inlet chamber and the respective service chambers as the spool is moved from its neutral position toward its respective positions providing substantially free communication with the respective service chambers, the spring means being selected to establish a differential pressure between the inlet chamber and each of the respective service chambers when they are communicated by the metering means and to establish the only substantial force tending to urge the dump spool toward the one end of the dump valve bore and limit communication between the inlet chamber and drain opening when the control valve spool is in its neutral position, and further comprising

an additional bore formed by the control valve body in communication with the inlet chamber and service chambers, an additional spool being arranged therein and coupled for reciprocal movement with the control valve spool, the metering means comprising axially elongated slot means in the additional spool for selectively communicating the inlet chamber with the service chambers.

3,903,788

APPARATUS FOR SMOKE AND HEAT PROCESSING OF FOOD PRODUCTS

Harold L. Freeland, Waelder, and James C. Flanagan, Corpus Christi, both of Tex., assignors to Koch Supplies Inc., Kansas City, Mo.

Filed Oct. 15, 1973, Ser. No. 406,575
Int. Cl.² A23B *4/04*
U.S. Cl. 99—475 **9 Claims**

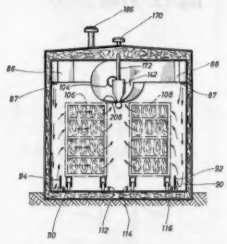
1. Apparatus for smoke and heat processing of food products, said apparatus comprising:

side walls, end walls, a ceiling and a floor defining an enclosure within which smoke laden heated air is contained and having at least one opening through which food products may be introduced into said enclosure for the purpose of smoke and heat processing;

a door assembly interfitting within said opening and forming a sealed closures for said opening, said food products being inserted and removed from said enclosure through said door assembly;

duct means disposed adjacent the upper portion of at least one of said side walls and having downwardly directed air outlet means supported thereby and oriented linearly along said one side wall, said outlet means directing a flow of heated and smoke laden air downwardly along said one side wall toward said floor;

blower means supported by said enclosure and having intake means communicating with said enclosure and exhaust means communicating with said duct means; and



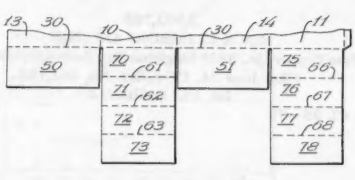
baffle means extending upwardly from said floor and extending linearly along the base of said one wall in spaced relation therefrom, said baffle means cooperating with said side wall and with said floor to define a shallow elongated trough in the bottom of said enclosure and generally below the level of that portion of the enclosure in which the food products are to be placed, siad trough constructed to receive downwardly directed air from said air outlet means and deflect the air back upwardly and cause air to flow inwardly laterally through the food products disposed within said enclosure.

3,903,789

CONTAINER FOR NEWSPAPER COLLECTION

Thomas Joseph Hurley, St. Paul, Minn., assignor to Hoerner Waldorf Corporation, St. Paul, Minn.

Filed Mar. 29, 1974, Ser. No. 456,077
Int. Cl.² B65B *13/00*
U.S. Cl. 100—34 **3 Claims**



1. A container made from foldable sheet-like material adapted to be used as a collection stand for newspapers or the like prior to recycling, comprising:

front, rear and side wall panels having top and bottom edges arranged and connected in a rectangular, tube-like configuration and adapted to stand upright on the bottom edges of said tube-like configuration;

said front panel having a substantially U-shaped slot cut therein extending upwards to said top edge of said front panel and extending downwards to within a predetermined height above the bottom of said front panel;

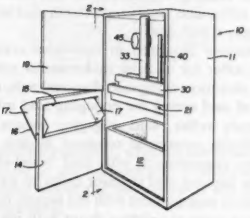
said side wall panels being connected to either lateral edge of said front panel and having foldable bottom support flaps hingedly connected to the bottom edge thereof; and said support flaps being foldable along fold lines parallel to said bottom edges of said side wall panels upward and inside said bottom end of said tubular arrangement to

form a support pedestal above said predetermined height from said bottom of said front panel, said support pedestal having a recessed center area, said pedestal and slot thereby allowing newspapers or the like to be easily deposited and removed from said container.

3,903,790
TRASH COMPACTOR

Floyd R. Gladwin, P.O. Box 1113, Southgate, Mich. 48192

Filed Oct. 16, 1974, Ser. No. 515,187
Int. Cl.² B30B *15/30*
U.S. Cl. 100—215 **9 Claims**



1. In a trash compactor having a trash receiving container into which loose trash is placed for compacting therein, with the container having an open end, and a compressor plunger arranged for reciprocating into and out of the container through said open end, with the plunger having a base face for contacting with and compressing against the trash within the container, and having side walls extending away from the base face, with the plunger being sized to closely fit within and through the container open end with its side walls closely adjacent to the periphery of said container open end, the improvement comprising:

at least a portion of said side walls along an edge of said base face, being stepped inwardly, i.e., in a direction towards the center of said base face, to form a rabbit-like L-shaped edge portion between the side wall portion and base face, so that the base face along said edge and the adjacent wall surface are spaced inwardly a considerable distance from the corresponding adjacent peripheral portion of said container open end;

whereby as the plunger moves through the open end into the container for compacting trash therein, any trash portions located at said plunger edge portion and caught between the plunger stepped edge portion and the periphery of the container open end, are pushed into the container by the portion of the wall forming the leg of the L-shaped step, thereby avoiding the trash portion jamming against the plunger wall portion and the container open end periphery.

3,903,791
SMALL ROLL, THIN BELT EMBOSSING APPARATUS

John De Ligt, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Aug. 31, 1973, Ser. No. 393,669
Int. Cl.² B44B *5/02*
U.S. Cl. 101—23 **6 Claims**

1. Apparatus for high pressure embossing a continuous high density material web of indefinite length comprising:

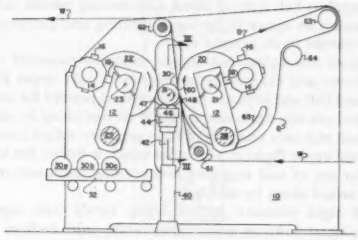
a. a pair of substantially cylindrical backing rolls having axes movably mounted to sustain relative parallelism therebetween;

b. a substantially cylindrical embossing roll;

c. support means to selectively engage the cylindrical surface of said embossing roll along the length thereof, said support means comprising loading means to press said embossing roll into the proximity between said backing rolls to form respective roll nips therebetween, each of said roll nips having a material in-flow and out-flow side respective thereto;

d. selectively positionable abutment means to limit the axial separation between said backing rolls to a magnitude less than the sum of the diameter of said embossing roll and the radii of said backing rolls;

e. an endless, thin, resilient material belt of appreciably greater periphery than the circumference of one of said backing rolls disposed for traveling about said one backing roll in a closed course passing through the roll nip comprising an embossing nip between said embossing roll and said one backing roll;



f. means to direct a continuous web of indefinite length through said embossing nip between said embossing roll and said endless belt;

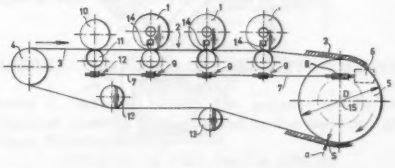
g. means to deliver rotational power to one of said backing rolls; and,

h. endless belt tensioning means disposed on the in-flow side of said embossing nip, proximate thereof, and comprising fluid discharge means disposed within a curvilinear portion of said closed course for applying a substantially constant longitudinal tensile stress to said belt regardless of reasonable dimensional variations in the proximity between said belt and said fluid discharge means.

3,903,792
ROTARY SCREEN PRINTER AUXILIARY CONVEYOR DRIVE TO ELIMINATE CREEP

Jacobus Gerardus Vertegaal, Boxmeer, Netherlands, assignor to Stork Amsterdam N.V., Amsterlveen, Netherlands

Continuation-in-part of Ser. No. 125,085, March 17, 1971, abandoned. This application Oct. 31, 1973, Ser. No. 411,338
Claims priority, application Netherlands, Aug. 25, 1972, 7204068
Int. Cl.² B41F *15/10;* **B65G** *23/04*
U.S. Cl. 101—118 **10 Claims**



1. A rotary screen printing machine comprising at least one thin-walled cylindrical stencil mounted for rotational movement around its longitudinal axis and operatively disposed in a printing path, two spaced apart rotatably mounted turning wheels, an endless belt disposed about the two turning wheels having an upper flight portion one surface of which constitutes the printing path of the printing machine, driving means operatively connected to one of the turning wheels, a pair of rigid rollers being disposed in the upper flight portion of the belt, one roller of said pair contacting the printing path, and the other roller being disposed on the opposite surface of the

upper flight portion, each of the rollers of the pair of rigid rollers being biassed toward the belt to exert a force thereon normal to the longitudinal axis of the belt to eliminate slippage between the belt and the pair of rollers, driving means operatively connected to at least one roller of the pair of rollers, the turning wheel to which the driving means is operatively connected and the pair of rollers cooperate with each other to maintain at least in the upper flight portion of the belt a constant liner velocity.

7. A rotary screen printing machine comprising, in combination:

a frame;

a drive turning wheel and an idler turning wheel rotatably mounted on said frame in horizontally spaced relation;

an endless belt trained about said turning wheels and presenting an upper flight for supporting and carrying along material to be printed upon;

at least one cylindrical stencil rotatably mounted on said frame and extending transversely of said upper flight of said belt and having a predetermined pattern for engaging and printing upon said material carried along by said belt;

one and only one pair of rigid pressure rollers contacting said upper flight at a location which is before the location for any of said engaging and printing upon said material carried along by said belt;

said rigid pressure rollers being firmly and vigorously pressed towards each other while said endless belt is disposed between said rollers for exerting a force on said belt which is perpendicular to the longitudinal axis of said belt so that the speed of said belt will always be identical to the tangential speed of said rigid pressure rollers;

drive means for rotating said drive turning wheel, each said cylindrical stencil, and at least one of said rigid pressure rollers;

one of said rigid pressure rollers having a diameter which is larger than the diameter of the other one of said rigid pressure rollers; and

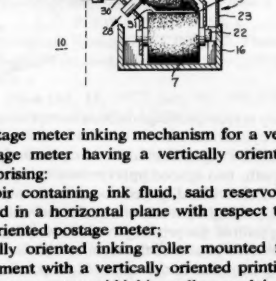
said endless belt is moved by the combined drive of said drive turning wheel and the driven rigid pressure roller to eliminate the effect of creep between said endless belt and said drive turning wheel.

3,903,793

INKING MECHANISM FOR A POSTAGE METER

Keith E. Schubert, Rowayton, Conn., assignor to Pitney-Bowes, Inc., Stamford, Conn.

Filed Aug. 23, 1974, Ser. No. 500,032
Int. Cl.² B41F *31/30*
U.S. Cl. 101—351 **1 Claim**



1. A postage meter inking mechanism for a vertically oriented postage meter having a vertically oriented printing drum, comprising:

a reservoir containing ink fluid, said reservoir generally oriented in a horizontal plane with respect to the vertically oriented postage meter;

a vertically oriented inking roller mounted for rotative engagement with a vertically oriented printing drum of said postage meter, said inking roller supplying ink to said drum as it rotatively engages therewith;

a supply roller generally horizontally mounted for rotation within said reservoir, said supply roller obtaining a supply of ink as it rotates within said reservoir;

a bevel-shaped transfer roller mounted for axial movement along a diagonal axis between said inking roller and said supply roller, said bevel-shaped transfer roller being intermittently engageable with said inking roller and said transfer roller, and when so engaged being caused to rotate when the inking roller is caused to rotate, and thereby causing the engaged supply roller to likewise rotate, whereby the supply roller will obtain ink from said reservoir as it turns, and said bevel-shaped transfer roller will transfer the obtained ink to said inking roller;

a spring mounted along said diagonal axis of the transfer roller, in biasing opposition to the movement of said transfer roller into engagement with said inking roller and said supply roller; and

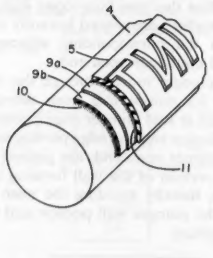
engaging means mounted in operative contact with said transfer roller for causing said transfer roller to move in an axial direction along said diagonal axis, and against the biasing of said spring for engaging said inking roller and said supply roller, said engaging means comprising a intermittently energized solenoid having a push rod in operative engagement with said bevel-shaped transfer roller for causing said transfer roller to move axially into intermittent engagement with the supply roller in order to supply the vertical printing drum with ink.

3,903,794

FOAM PACKING SHEET FOR FLEXOGRAPHIC RUBBER PRINTING PLATES

Edward H. Grupe, Appleton, Wis., and John F. Hechtman, Munising, Mich., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 11,093, Feb. 13, 1970, abandoned.
This application Apr. 8, 1974, Ser. No. 458,820
Int. Cl.² B41F *27/06;* **B32B** *3/26*
U.S. Cl. 101—376 **4 Claims**

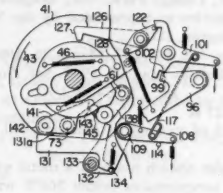


2. In combination, an arcuate flexographic printing plate which is pliable and has a relatively soft, stretchable printing surface subject to being deformed, and a flexible mounting sheet support for the printing plate adhered to the concave surface of the arcuate plate, said support comprising a flexible strength member and a foam cushion member intimately adhered to the strength member and being limitedly compressible with said printing plate without being subject to significant lateral spreading to absorb pressure applied to said printing plate, said foam cushion member being of greater thickness than said strength member, said composite being smooth surfaced to the touch on the side remote from the strength member and the thickness of the mounting sheet being between about 25 to 90% of the overall thickness of the printing plate itself, the foam cushion member having a density in the range of about 25 to 45 pounds per cubic foot.

3,903,795
DEVICE FOR CLAMPING THE TRAILING END PORTION OF A SHEET

Minoru Suzuki, Yokohama, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed May 30, 1973, Ser. No. 365,084
Claims priority, application Japan, June 17, 1972, 47-60714
Int. Cl.² B41F *21/04*
U.S. Cl. 101—409 **5 Claims**



1. In a duplicating machine, wherein the leading margin of a sheet is clamped to the periphery of a rotary drum and the sheet is positioned about the periphery of the drum, the improvement comprising:

a. means defining an elongated recessed portion in the periphery of the drum disposed parallel to the axis of the drum and adapted to receive the trailing margin of the sheet after the sheet is positioned about the periphery of the drum;

b. an elongated clamp member disposed parallel to the recessed portion and adapted for movement into and out of engagement with the recessed portion; and

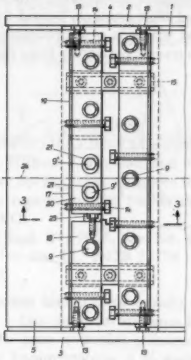
c. means for moving the elongated clamp member out of the recessed portion while the sheet is being positioned about the periphery of the drum and for moving the elongated clamp member into engagement with the recessed portion while the trailing margin is disposed therein after the sheet has been positioned about the periphery of the drum to clamp the trailing margin to the periphery of the drum, wherein said means for moving the elongated clamp member into and out of engagement with the recessed portion comprises a pair of supporters each holding one of the opposite ends of the clamp member and mounted on one of the opposite ends of the drum for rotational and radial movement relative to the drum, means for restraining the supporters from rotating while the leading margin of the sheet is being clamped to the periphery of the drum, cam means for moving the supporters radially of the drum while the supporters are restrained from rotating so as to move the clamp member radially outwardly from the periphery of the drum, and cam means for releasing the supporters for rotational movement together with the drum after the trailing margin of the sheet is held in the recessed portion.

3,903,796
MEANS FOR CLAMPING ON FLEXIBLE PRINTING PLATES

Willie Jeschke, and Claus-Peter Zander, both of Heidelberg, Germany, assignors to Heidelberger Druckmaschinen Aktiengesellschaft, Heidelberg, Germany

Filed Feb. 13, 1974, Ser. No. 442,133
Claims priority, application Germany, Mar. 1, 1973, 2310228
Int. Cl. B41f *27/12*
U.S. Cl. 101—415.1 **2 Claims**

1. In means for clamping printing plates onto cylinders of offset printing presses, the cylinders having end flanges and an axially extending slot along said cylinders between said end flanges, a clamping assembly positioned in said slot, said clamping assembly comprising, two or more tandem mounted clamping rail pairs, each of said rair pairs consisting of a top and a bottom clamping rail and slots positioned in said top clamping rail, clamping screws for clamping the printing plate between and in contact with the top and bottom clamping rail pairs, screws for circumferentially tensioning the printing plate on said cylinder, screws for axially adjusting and supporting said clamping rail pairs relative to one another and to the end flanges, means to avoid ridges in a plate while deforming said plate by providing that said tandem mounted clamping rail pairs are mounted in said axially extending slot in such a manner that said top clamping rail overlaps said bottom clamping rail of an adjacent rail pair, and means to clamp overlapping rail ends together comprising at least one clamping screw passing through said slots in said top clamping rail, whereby said overlapping rail ends may be released during deformation of said plate to greatly increase the said deformed area of said plate.



3,903,797
MULTIPLE COPY PHOTOGRAPHIC SYSTEM

Richard F. Bartlett, Winchester, and Laura K. Case, Burlington, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Division of Ser. No. 728,898, May 14, 1968, Pat. No. 3,587,465. This application June 29, 1970, Ser. No. 60,174
Int. Cl.² B41N *1/24*; B41L *11/00*; B41M *5/02*
U.S. Cl. 101—473 **11 Claims**

1. An offset printing master comprising an imagewise crazable thermoplastic layer on a substrate therefor including a layer comprising an oleophilic or hydrophilic material intermediate said thermoplastic layer and substrate and in surface contact with said thermoplastic layer, and wherein the thermoplastic layer is coated with a layer of gelatin.

3,903,798
METHOD AND MEANS OF GENERATING GRAVITY WAVES

Charles T. McGraw, Atlanta, Ga., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

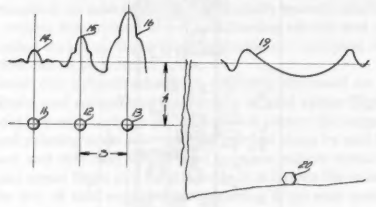
Filed Dec. 6, 1967, Ser. No. 690,702
Int. Cl.² F42D *1/06*
U.S. Cl. 102—10 **5 Claims**

1. A method of generating a gravity wave disturbance on the surface of an aqueous medium of such a magnitude and frequency that it simulates the pressure disturbance of said aqueous medium produced by the passage of a marine vehicle therethrough to detonate marine mines located within said aqueous medium, said method comprising the steps of:

positioning a first explosive charge at a predetermined location with respect to the location of said marine mines and at a predetermined depth beneath the surface of said aqueous medium;

positioning a predetermined number of additional explosive charges at predetermined depths within said aqueous medium and between said first explosive charge and said marine mines so as to effectively assemble an array of positioned explosive charges lying in a substantially horizontal configuration and extending outwardly from said first explosive charge toward said marine mines;

detonating said first explosive charge, thereby generating a gravity wave surface disturbance which has a displacement associated high pressure period followed by a low pressure period which is of a predetermined time duration and which travels outwardly from the location of said



first explosive charge toward said marine mines on the surface of said aqueous medium; and

successively detonating selective ones of said additional explosive charges in a predetermined time relationship with respect to the detonation of said first explosive charge as to effect reinforcement of said high pressure disturbance and lengthen the duration of said low pressure period, said time relationship being predetermined with relation to the distance between said first explosive charge and said selective ones of said additional explosive charges and the depth below the surface of said selective ones of said additional charges.

3,903,799
METHOD OF BLASTING

Richard E. Walker, 237 Charleston St., Cadiz, Ohio 43907

Filed Sept. 20, 1973, Ser. No. 399,132
Int. Cl.² F42D *1/06*
U.S. Cl. 102—23 18 Claims

BLAST SCHEDULE

CIRCUIT NO.:	10	9	8	7	6	5	4	3	2	1
CIRCUIT TIME:	540	480	420	360	300	240	180	120	60	0
	+	+	+	+	+	+	+	+	+	+
TIME DEL.:	125	125	125	125	125	125	125	125	125	125	Row
DET. TIME:	665	605	545	485	425	365	305	245	185	125	5
TIME DEL.:	100	100	100	100	100	100	100	100	100	100	Row
DET. TIME:	540	500	420	460	400	340	280	220	160	100	4
TIME DEL.:	75	75	75	75	75	75	75	75	75	75	Row
DET. TIME:	615	555	495	435	375	315	255	195	135	75	3
TIME DEL.:	50	50	50	50	50	50	50	50	50	50	Row
DET. TIME:	590	530	470	410	350	290	230	170	110	50	2
TIME DEL.:	25	25	25	25	25	25	25	25	25	25	Row
DET. TIME:	565	505	445	385	325	265	205	145	85	25	1
	–	–	–	–	–	–	–	–	–	–	

OPEN FACE

1. A method of removing material from an open face of a quarry comprising the steps of: arranging a first column of blasting assemblies of progressively greater time delay periods in a column proceeding away from the quarry face, arranging a second column of blasting assemblies of progressively greater time delay periods in a column proceeding away from the quarry face, respective assemblies of said columns forming rows that are generally parallel to the quarry face and the assemblies of each row having generally the same time delay, causing a first electrical ignition circuit to be connected to said first column of blasting assemblies with the assemblies being in parallel circuit, causing a second electrical ignition circuit to be connected to said second column of blasting assemblies with the assemblies being in parallel circuit, and sequentially energizing said first and second ignition circuits at a time interval generally between approximately 10 and approximately 100 milliseconds to achieve a successive peeling type of crack propagation in the successive rows of material.

3,903,800
METHOD FOR PREPARING HEAT RESISTANT MILD DETONATING FUSE

Earl E. Kilmer, College Park, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 443,107, March 26, 1965, abandoned. This application May 17, 1967, Ser. No. 651,339
Int. Cl.² F42B *3/10*
U.S. Cl. 102—27 R 7 Claims

1. A method of making detonating cord comprising the steps of

filling a tubular sheath made of a metal which can be annealed at temperatures below 568°F with an explosive material in particulate form selected from the group consisting of 3,3′-diamino-2,2′,4,4′,6,6′-hexanitrobiphenyl; 2,2′,2″,4,4′,4″,6,6′,6″-Nonanitroterphenyl; and 2,2′,4,4′,6,6′-Hexanitrostilbene,

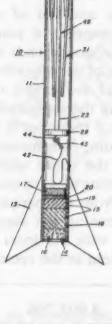
reducing said explosive filled tubular sheath to a lesser diameter to thus compact said explosive,

and annealing by application of heat said sheath at a temperature below 568°F.

3,903,801
MODEL ROCKET AND RECOVERY DEVICE THEREFOR

Walter E. Senoski, 1720 Elderslee Rd., Pittsburgh, Pa. 15227

Filed July 12, 1973, Ser. No. 378,595
Int. Cl. F42b *15/10*; A63h *27/00*; C06d *1/04*
U.S. Cl. 102—34.1 5 Claims



1. A model rocket comprising a body tube, a motor mounted in the lower end of the body tube, a nose cone frictionally engagable in the upper end of the body tube and recovery means disposed within the body tube, said recovery means comprising:

a. a shaft, the top end of which is mounted to and coaxial with the underside of the nose cone and the bottom end of which is mounted to and coaxial with a blow-out piston;

b. a tube coaxial with and rotatable about the upper end of the shaft;

c. a rotor mount disc fixably mounted to and coaxial with the tube;

d. a plurality of evenly spaced apart rotor blade assemblies pivotally mounted on the underside of the rotor mount

disc whereby when said blade assemblies are in open configuration they are substantially parallel to the horizontal plane of the rotor mount disc and when said blade assemblies are in folded configuration they are substantially parallel to the longitudinal axis of the shaft;

e. means for elastically biasing said rotor blade assemblies in open configuration; and

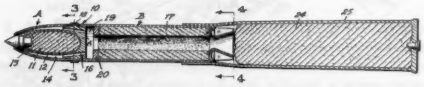
f. a shock cord, one end of which is secured to the underside of the piston and the other end of which is secured to the body tube.

3,903,802

SHELL CONSTRUCTION SEALING WASHER

John C. Squiers, Grosse Pointe Woods, Mich., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 26, 1955, Ser. No. 530,921
Int. Cl.² F42B *9/10*
U.S. Cl. 102—38 **6 Claims**



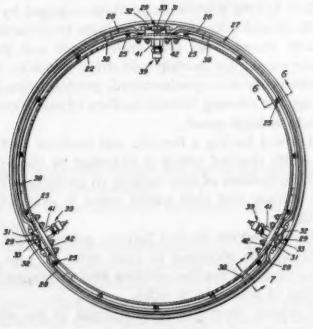
1. A gun launched ram jet projectile having a warhead assembly and an attached shell structure mounted within a cartridge casing, the combination comprising an explosive charge within an inner casing supported centrally within an outer casing and spaced therefrom to provide an air passage therebetween, a tubular solid fuel grain fitted in the inner wall of said shell structure and axially spaced from said inner casing, said grain defining a combustion chamber, an aluminium ring having a central opening substantially the same diameter as the center longitudinal bore of said tubular grain cemented to said inner casing and axially spaced therefrom when in a closed position, said ring when in said closed position sealing said air passage to prevent escape of fuel gases while said shell is in a gun barrel, and to move axially to an open position against said grain in response to air pressure during free flight of said projectile to provide passage of said air to said combustion chamber.

3,903,803

MISSILE SEPARATION MEANS

William A. Losey, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 12, 1960, Ser. No. 28,809
Int. Cl. F42b *15/12*
U.S. Cl. 102—49.5 **4 Claims**



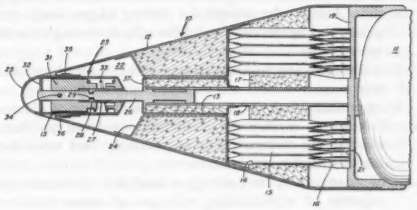
1. In a missile of the type having a ballistic missile component and a booster motor adapted to propel the missile component during the boost phase of its trajectory, the booster motor having a forward section and the missile component being disposed so as to co-extensively abut the forward section, the improvement comprising; an annular member secured to the forward edge of said section and extending inwardly thereof, said member having an outwardly facing recess, a plurality of studs disposed inwardly of said missile component and affixed thereto, said studs having indented portions projecting into and being at least in part contiguous with said recess, a locking band, and releasable means holding a locking portion of said band tightly within said recess and against said indented portions for securely connecting said missile component to said section.

3,903,804

ROCKET-PROPELLED CLUSTER WEAPON

John L. Luttrell; William E. Preston, and William B. Richardson, all of Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 27, 1965, Ser. No. 491,858
Int. Cl.² F42B *13/50*
U.S. Cl. 102—69 **12 Claims**



1. A missile warhead comprising

a frusto-conical warhead fairing having an axial bore extending therethrough,

a base plate adapted to be mounted upon a missle and having the base of the frusto-conical fairing secured thereto, said plate closing one end of said axial bore,

a support shaft mounted upon said base plate and extending into said axial bore,

said fairing having a counterbore formed therein adjacent said base plate,

a plurality of submissiles positioned within said counterbore,

said fairing having an internal cavity formed therein adjacent the open end of said axial bore and being in fluid communication with said axial bore, the diameter of said cavity being greater than the diameter of said bore,

a submissile release assembly slideably mounted upon said shaft for movement from a first position wherein said assembly prevents air flow into the cavity to a second position wherein said assembly permits air to flow into said cavity, and

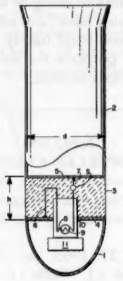
means for locking said release assembly in said first position and for unlocking said release assembly in response to deceleration of the warhead for movement to said second position,

whereby ram air pressure about the warhead may enter the cavity upon deceleration of the warhead occurring at the termination of thrust by a warhead propelling motor to tear away the fairing and release the submissiles for a ballistic trajectory toward a target.

3,903,805
IMPACT FUZE

Hrair Philip Hovnanian, Winchester, Mass., assignor to Avco Corporation, Cincinnati, Ohio

Filed Feb. 25, 1959, Ser. No. 795,506
Int. Cl.[2] F42C 11/00
U.S. Cl. 102—70.2 R 3 Claims

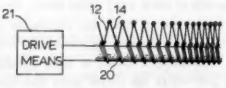


1. In a missile the combination comprising:
a. a hollow metallic nose section and a hollow metallic tail section, said sections being concentric about the longitudinal axis of the missile for storing electrostatic energy generated by the passage of the missile through the atmosphere;
b. a dielectric section separating and electrically insulating said nose and tail sections one from another;
c. oppositely disposed first and second electrically conductive plates electrically insulated one from another and electrically connected to respectively said nose section and said tail section; and
d. a substantially noninductive electrical detonator circuit capable of withstanding voltages of about 5,000 volts including electrically activated detonating means connected between said first and second plates whereby said nose section first making electrical connection with a target at impact discharges its associated charge to the target and a potential difference is thereby established across said detonator circuit.

3,903,806
PLEATED, VARIABLE SPEED CONVEYOR AND CONVEYOR DRIVING MEANS

Robert U. Ayres, Washington, D.C.; Richard P. McKenna, Bethesda, Md., and Sammie G. Keahey, Landenberg, Pa., assignors to Variflex Corporation, Roxbury, Conn.

Filed Jan. 17, 1974, Ser. No. 434,105
Int. Cl. B65g 17/06
U.S. Cl. 104—25 17 Claims

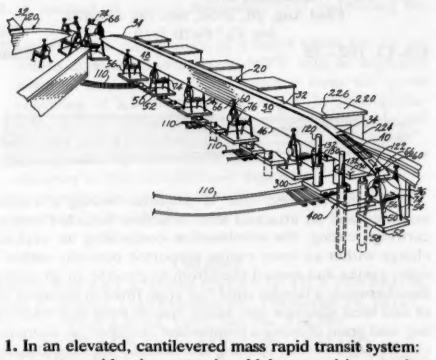


1. A pleated conveyor for the movement of objects including means for varying the speed of the objects from a first speed to a second speed, said conveyor comprising:
a belt for supporting said objects including a plurality of folds of sufficient rigidity to support said objects, said folds being disposed along said belt, each fold being aligned substantially vertical and perpendicular to the direction of motion of said belt and connected to the folds immediately adjacent thereto;
means for moving said belt including said means for varying the spacing between the ridges of successive folds of said belt from a first distance corresponding to said first speed to a second distance corresponding to said second speed; and
means for supporting said belt.

3,903,807
MASS RAPID SYSTEM

Averette T. Lee, 1119 Stephens St., Smyrna, Ga. 30080

Filed Jan. 12, 1973, Ser. No. 323,248
Int. Cl. E01b 25/12
U.S. Cl. 104—131 25 Claims

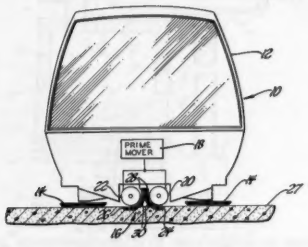


1. In an elevated, cantilevered mass rapid transit system:
a. a mass rapid unitary transit vehicle comprising an elongated vehicle structure having an elongated wide, continuous substantially horizontal and smooth bottom, said vehicle having sides with substantially vertical portions,
b. a plurality of individual, spaced pylons supporting said vehicle in spaced relation above the ground including uneven terrain and each pylon comprising a base supported on the ground or other support surface and a support structure extending upwardly therefrom defining a space within said support structure in which said transit vehicle is supported whereby the front of said vehicle is cantilevered outwardly from one pylon toward the next until engaged therewith,
c. at least more than one of said pylons in supporting said vehicle at any given time having a power driven vehicle drive wheel mounted thereon within the confines of said pylon and the outer contact surface of said wheel entirely substantially across the width of said pylon, said wheel having a substantially continuous contact cylindrical surface having transverse portions engaged by the entire width of said bottom of said vehicle continuously as said vehicle moves over said drive wheel and there being power means for driving said drive wheel on said pylon continuously at a synchronized, predetermined speed to engage the moving bottom surface of said moving transit vehicle at high speed,
d. said wheel having a flexible and resilient surface across the width thereof which is indented by the engagement with the bottom of said vehicle to provide a footprint as said vehicle and said wheel move in contact with one another,
e. and said pylons further having guide means including guide wheels attached to both sides of said pylon for contacting and thereby guiding said substantially vertical portion of said vehicle sides,
f. said vehicle having a nose defined in the direction of movement and said bottom being inclined upwardly at said nose whereby there is a gradual contact between the vehicle and the drive wheel.

3,903,808
EDDY CURRENT PROPULSION SYSTEM

Andrew Foldes, Box 1094, Elizabeth, Colo. 80107

Filed Sept. 18, 1972, Ser. No. 290,035
Int. Cl. H02k 41/02
U.S. Cl. 104—148 LM 18 Claims

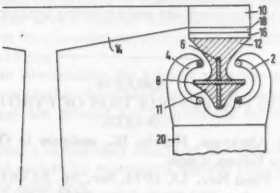


1. A propulsion system for a vehicle of the type adapted to follow a fixed roadway comprising: at least one rotor rotatably carried by said vehicle and having an axis of rotation aligned with the axis of displacement of said vehicle; a prime mover carried by said vehicle and coupled to said rotor for rotation thereof; an elongated conductive rail disposed on said roadway along and defining a path of travel for said vehicle, said rotor being disposed in alignment with and adjacent to but spaced apart from said conductive rail; and means associated with said rotor for developing a circumferentially varying magnetic field pattern circulating about said rotor and a corresponding magnetic field pattern circulating about said conductive rail whereby rotation of said rotor produces reactive forces between said rotor and said rail.

3,903,809
ELECTROMAGNETIC SUSPENSION GUIDANCE SYSTEM FOR A MOVING VEHICLE

Jürgen Miericke, Nurnberg; Hans Hieronymus, Erlangen, and Franz Pawlitschek, Neunhof, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Dec. 4, 1972, Ser. No. 311,567
Claims priority, application Germany, Dec. 7, 1971, 2160666
Int. Cl.[2] B61B 13/08
U.S. Cl. 104—148 SS 14 Claims

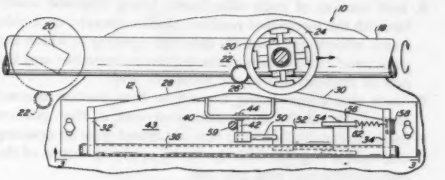


1. An electromagnetic system for the suspension guidance of a moving vehicle comprising:
   a. a zero flux electrodynamic suspension guidance means comprising:
      1. at least one loop of non-magnetic conductive material;
      2. at least two superconducting electromagnetic loops disposed on opposite sides of said loop of non-magnetic material inducing currents therein which generate an upward and a downward repulsion force on said superconducting loops;
   b. a ferromagnetic body disposed above said superconducting loops and cooperating with at least one of said superconducting loops to generate a lifting force on the vehicle in a direction opposite to the force of gravity on said superconducting loops.

3,903,810
VEHICLE CONTROL DEVICE

Vercoe C. Jones, Easton, Pa., assignor to SI Handling Systems, Inc., Easton, Pa.

Filed June 28, 1974, Ser. No. 484,377
Int. Cl.[2] B61B 13/12
U.S. Cl. 104—166 13 Claims

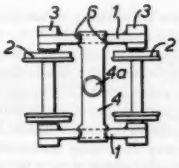


1. A vehicle control device for use with vehicles adapted to move along a track comprising a speed control member having a generally straight section between a first angled section having a cam surface for controlling deceleration of a vehicle and a second angled surface having a cam surface for controlling the acceleration of a vehicle, each of said angled sections converging toward and terminating at said straight section, means supporting said control member for movement between operative and inoperative positions, motor means for selectively moving said control member from an inoperative position to an operative position, and a movable latch mounted to maintain the control member in its operative position, said latch being mounted for movement to an inoperative position wherein it no longer maintains the control member in an operative position.

3,903,811
RAILWAY BOGIE

Frederick William Sinclair, Caithness, Lansdown Rd., Gloucester, England

Filed Oct. 2, 1973, Ser. No. 402,725
Claims priority, application United Kingdom, Oct. 4, 1972, 45653/72
Int. Cl. B61f 5/08, 5/50; F16d 65/14
U.S. Cl. 105—182 R 4 Claims



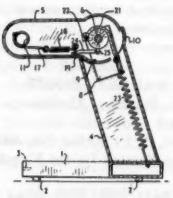
1. A bogie truck for a rail vehicle, including:
1. a pair of rigid side frames,
2. front and rear axles extending between the side frames,
3. a rearwardly facing front abutment and a forwardly facing rear abutment on each of the side frames,
4. a transverse member extending between the side frames, said transverse member having front and rear abutments at each end portion thereof arranged in respective opposed relation to the front and rear abutments on the side frames so that each two opposed abutments cooperate to form a spaced pair of abutments,
5. a resilient block comprising alternate laminations of a rigid material and of a resilient material disposed between each spaced pair of abutments,

6. each block being inclined downwardly from its abutment on the transverse member to its abutment on the side frame, said blocks acting as force-transmitting members between the side frames and the transverse member such that vertical and lateral loads applied to the transverse member and traction and braking forces cause combined shear and compression loads in said resilient material,
7. the load transmitted from the transverse member to the side frames producing bending moments in the side frames such that the section of each side frame between the front and rear abutments functions substantially as a tension tie,
8. said section of each side frame being disposed solely beneath the associated resilient blocks whereby each side frame affords an upwardly directed opening in which the associated end portion of the transverse member and the pair of resilient blocks are received, and
9. each side frame being formed in that portion thereof rearwardly of the front abutment and in that portion thereof rearwardly of the rear abutment with an opening disposed in register with the brake-applying means of the associated wheel and axle set.

3,903,812
DRAFTING TABLE

Gary Cowley, 2331 Main, Vancouver, British Columbia, Canada

Filed July 27, 1973, Ser. No. 383,347
Int. Cl.[2] A47F 5/12
U.S. Cl. 108—2 7 Claims

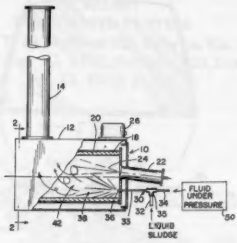


1. A drafting table comprising a horizontally disposed V-shaped base, with the spread of the V to the front; a single, articulated, forwardly inclined post rising from the apex thereof, said post consisting of a lower trunk portion and an extension column portion continuing upwardly from the top of the trunk and hingedly connected thereto by a horizontal pivot disposed transversely of the V of said base, whereby said extension column may be swung forwardly from upright to approximately horizontal position over the open, spread, front of the V-shaped base; a drawing board mounted on the top of said column portion and tiltable on an axis paralleling said pivot; counter balancing mechanisms for said hinged column portion of said tiltable drawing board respectively; locking means for releasably securing the mentioned hinged and tiltable elements in selected adjusted positions, wherein the counter balancing mechanism for the extension column portion of the articulated forwardly inclined post includes a wheel rotatable on said pivot, a flexible member extending part way around the circumference of the wheel and being secured thereto at one end, a tension spring stretched between the other end of said member and the bottom of the post, a radial extension on said wheel and an abutment on said extension column portion engageable therewith.

3,903,813
METHOD AND APPARATUS FOR INCINERATING SLUDGE

Pei-Tai Pan, Pawtucket, R.I., assignor to Colt Industries Operating Corporation, New York, N.Y.

Filed May 28, 1974, Ser. No. 473,747
Int. Cl.[2] F23G 5/12
U.S. Cl. 110—7 B 7 Claims



1. An incineration apparatus particularly adapted to achieve optimum combustion of sludge wastes and associated undesirable gases, including a chamber in which a combustion reaction of said sludge wastes and gases may occur, said chamber having an exit port to evacuate hot gases produced by said combustion reaction from said chamber, means for injecting the sludge wastes into said chamber under pressure to produce a sludge spray including restrictive orifice means mounted near a terminal end of a conduit means for conducting said sludge wastes into said chamber, said orifice means opening into said chamber, said conduit means in communication with a source of fluid under pressure, said fluid under pressure being mixed with said sludge wastes prior to the passage of said sludge wastes through said restrictive orifice means, the pressurized injection of said sludge wastes into said chamber acting to atomize said sludge wastes for dispersal as said spray into said combustion chamber, while preventing clogging of said means for injecting said sludge wastes by particulate matter, and means selectively disposed in said chamber for rapidly heating said sludge spray sufficiently to obtain combustion of both the sludge wastes and any undesirable gases in said chamber, said means for heating including a burner producing an outwardly extending flame, said burner being mounted on a wall of said chamber in spaced relationship to and at a divergent angle relative to said restrictive orifice means to prevent quenching of said burner flame by the sludge spray and thereby eliminate smoke during the operation of the incinerator.

3,903,814
METHOD FOR DESTRUCTION OF PYROTECHNIC WASTE

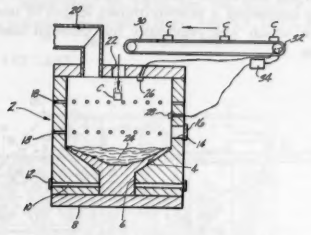
Richard D. Altekruse, Herrin, Ill., assignor to Olin Corporation, New Haven, Conn.

Filed Nov. 13, 1974, Ser. No. 523,611
Int. Cl.[2] F23G 7/00; F23K 3/00
U.S. Cl. 110—18 R 6 Claims

1. A method of incinerating pyrotechnic material which has a combustion temperature of about 5,000°F or greater, said method comprising the steps of:

a. providing an incinerator having top, bottom and side walls, and a stack including pollution controls therein;
b. providing an incandescent fuel bed on said incinerator bottom wall, said fuel bed overlaying at least a portion of said bottom wall to insulate the latter against heat generated by combustion of a charge of the pyrotechnic material;
c. dropping a charge of pyrotechnic material or predetermined size through said incinerator;

d. igniting said charge of pyrotechnic material as it falls through said incinerator to produce a fireball the periphery of which does not touch said top and side walls of said incinerator; and



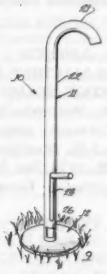
e. passing gaseous products of combustion of said fireball through said stack.

3,903,815

FERTILIZER APPLICATOR TOOL

Robert D. Winkler, Desplaines, Ill.

Filed Sept. 28, 1973, Ser. No. 401,582
Int. Cl. A01c *5/02*
U.S. Cl. 111—1 **6 Claims**



1. A fertilizer applicator tool intended for use with solid bullet shaped pellets of fertilizer in a manner to inject the pellets beneath the surface of the ground, comprising:

an elongated hollow tubular member open at one end and closed at the opposite end defining an elongated chamber therebetween;

a flat plate surrounding the tubular member open end extending normal to the axis of the tubular member adapted to engage the ground and support the tubular member thereon;

an elongated rod disposed axially in the chamber adapted for axial reciprocal movement therein toward and away from the open end;

a first elongated longitudinally extending slot in the tubular member side wall extending along the middle and lower portions thereof;

a manually operable foot pedal having one end connected to the rod with the opposite free end projecting radially therefrom through the first slot adapted to be engaged by an individual's foot in a manner urging the rod outwardly of the open end; and

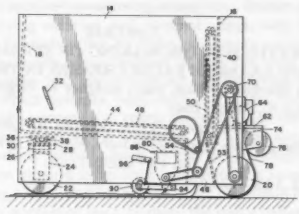
a second slot disposed in the tubular member side wall immediately above the ground engaging plate of a size and configuration to permit insertion therethrough of the bullet shaped fertilizer pellets into the chamber poriton located below the bottom end of the rod with the pointed end of the pellet oriented downwardly toward the ground whereby depressing the foot pedal will engage the rod bottom end with the pellet top end in a manner to drive the pellet into the ground.

3,903,816

METHOD AND MEANS OF PRODUCING GRASS SOD

Jack W. Brem, 2687 Chatsworth St., San Diego, Calif. 92120

Filed Feb. 8, 1974, Ser. No. 440,711
Int. Cl.² A01C *19/00*
U.S. Cl. 111—1 **4 Claims**



1. A machine for producing a seeded mulch blanket for growing grass and other ground cover products on a surface comprising:

a. a machine body movable in a forward direction over the surface;

b. means mounted in said body for applying water-impervious material to the surface as the body moves;

c. means mounted in said body for laying a layer of growth medium of generally uniform thickness on said water-impervious material;

d. a seeder for distributing seeds on said growth medium layer; and

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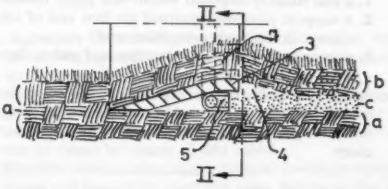
3,903,817

METHOD AND DEVICE FOR SOIL IMPROVEMENT

Gunnar E. W. Lewin, Pipersgatan 11, 112 24 Stockholm K, Sweden

Filed Oct. 26, 1973, Ser. No. 410,024
Claims priority, application Sweden, Nov. 1, 1972, 14149/72
Int. Cl.² A01C *23/02*
U.S. Cl. 111—7 **4 Claims**



1. A device for cutting continuous vertical channels and a continuous horizontal channel uniting said vertical channels under the root system of a grass lawn and for feeding a continuous layer of uncompressed material into the vertical channels and the horizontal channel, comprising a pair of spaced hollow carrier knife and pipe combinations, each pipe of said combinations being disposed generally vertically, having a forwardly facing vertical cutting edge formed at one side and having a bore open at the top and bottom, an elongated, substantially horizontal knife for slicing a layer under a grass root system near the surface of the ground, said knife having a forwardly facing horizontal cutting edge and an upwardly and rearwardly inclined blade, an elongated, substantially

horizontal pipe having a bore and being disposed beneath said knife, said horizontal pipe being connected at its ends to said pair of pipes of the pipe and knife combinations in such manner that the bore of each vertical pipe communicates with the bore of the horizontal pipe, and a rearwardly facing nozzle on said horizontal pipe for discharging uncompressed material, said upwardly inclined blade of the knife serving to lift a surface layer of the ground for introduction of said uncompressed material to the resulting open space below the layer of ground as the horizontal knife is drawn forward in the direction of the knife edges on the vertical pipes.

3,903,818

APPARATUS FOR THE MAKING OF STRAIGHT SEAMS, FOR EXAMPLE FALSE CREASES IN TROUSERS

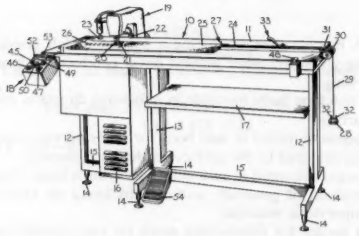
Nerino Marforio, Milan, Italy, assignor to Virginio Rimoldi & C. S.p.A., Milan, Italy

Filed Apr. 8, 1974, Ser. No. 459,053

Claims priority, application Italy, May 22, 1973, 24369/73

Int. Cl.² D05B *21/00*

U.S. Cl. 112—121.15 **7 Claims**



1. In a seaming apparatus which includes a bed having a sewing surface and a sewing machine having means for feeding and for sewing a workpiece, the combination comprising,

a. rectilinear guide means mounted on the sewing surface and extending from a position adjacent a needle of the sewing machine in a direction substantially parallel to the direction of travel of a workpiece when it is being seamed;

b. retaining means mounted within said rectilinear guide means for sliding movement in a forward stroke toward a most forward location adjacent the needles of the sewing machine and a return stroke away from the sewing machine, said retaining means, (b), comprising,

1. a pad slidably disposed within said guide means,

2. a support pivotally mounted on that end of said pad nearest to the sewing machine, and

3. means on said support attaching said pad to the workpiece, and

c. means attached to that end of said pad furtherest from the sewing machine to bias said retaining means away from the sewing machine and to thereby tension the workpiece.

3,903,819

RIBBON CHARGING APPARATUS

Sven Gerhard Andersson, Ljungskile, Sweden (45010)

Filed Apr. 24, 1973, Ser. No. 354,037

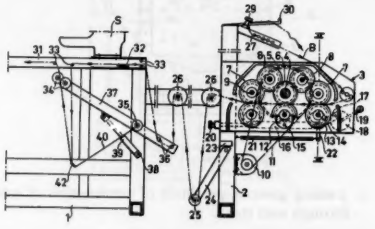
Int. Cl.² D05B *23/00*

U.S. Cl. 112—121.27 **6 Claims**

1. In apparatus for feeding elastic ribbon material from a supply of such material to a machine for the automatic manufacture of annular ribbons from such ribbon material wherein said machine is of the type including means for cutting off a selected length of the ribbon and for then overlapping and joining the severed ends, the improvement comprising:

drive means for at times feeding ribbon from said source toward a carding means in the path of the advanced ribbon path which is effective to prevent the reverse feeding of said ribbon,

ribbon-feeding means at times effective on each cycle of annular ribbon manufacture to stretch the ribbon between the source and said carding means while concurrently advancing a predetermined length of unstretched ribbon which was previously fed through said carding means,



said ribbon feeding means being at other times effective on each cycle of annular ribbon manufacture to slacken said stretched ribbon while concurrently advancing through said carding means said predetermined length of ribbon, and means responsive to the tension in the stretched ribbon between the source and said carding means for advancing ribbon from said source.

3,903,820

EDGE CONTROL FOR MACHINE SEWING PARALLEL EDGE SEAMS

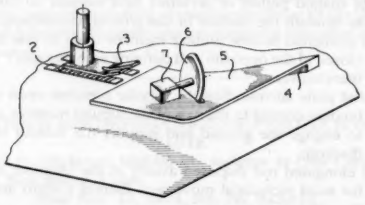
Johann O. Kleinschmidt, Wettersbach, and Wolfgang Niem, Leonberg, both of Germany, assignors to Union Special Maschinenfabrik G.m.b.H., Stuttgart, Germany

Filed Oct. 22, 1974, Ser. No. 517,027

Claims priority, application Germany, Oct. 25, 1973, 2353399

Int. Cl.² D05B *35/10*

U.S. Cl. 112—153 **8 Claims**

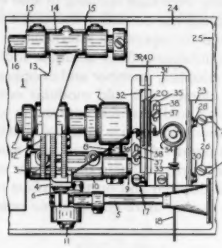


1. An edge control device for sewing material in connection with a sewing machine for the production of a seam parallel to the edge of the material, said edge device comprising a stop bar and a hold down means extending transversely from said stop bar beyond an intended seam line for preventing material being sewn from rising, said edge control device being characterized by at least one freely rotatable guide roller for aligning an edge of material being sewn with said stop bar, and means mounting said guide roller in position relative to said stop bar that the direction of travel imposed upon said guide roller by advancing material being sewn imparts continuously to the material a component of movement in a direction towards said stop bar.

3,903,821
CAM THREAD-PULLING DEVICE FOR THE LOOPER THREAD OF A SEWING MACHINE

Nerino Marforio, Milan, Italy, assignor to Virginio Rimoldi & C. S.p.A., Milan, Italy

Filed Mar. 20, 1974, Ser. No. 452,719
Claims priority, application Italy, Apr. 13, 1973, 22983/73
Int. Cl.[2] D05B 49/00
U.S. Cl. 112—242 2 Claims

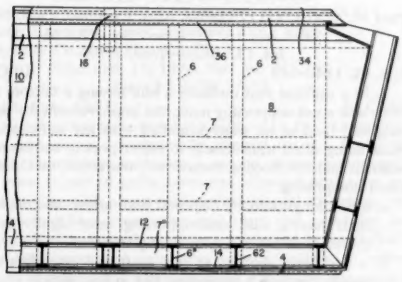


1. A cam thread pulling device for the looper thread of a sewing machine comprising a cam operatively driven by a rotating shaft, a support bracket mounted on the sewing machine adjacent said cam, a plate member including means defining an elongated opening therein through which said cam can extend and including thread guiding means thereon to direct thread in a direction substantially laterally across said elongated opening, means securing said plate member to said support bracket for adjustable rotation about an axis substantially parallel to the axis of the rotating shaft to expose a selected amount of said cam beyond the surface of said plate member and thereby provide for the take up of different lengths of thread, and means contacting said plate member and said support bracket to secure them together in a selected position where no rotation of said plate member will occur during operation of the sewing machine.

3,903,822
BARGE WHICH CAN BE STACKED ON BARGE-CARRYING SHIPS

Robert Le Grand, Paris; Christian Fréville, Sevran, and Francois Colas, Bourg-la-Reine, France, assignors to Cegedur Societe de Transformation de l'Aluminium, Paris, France

Filed June 17, 1974, Ser. No. 479,767
Claims priority, application France, June 19, 1973, 73.22185
Int. Cl.[2] B63B 35/28
U.S. Cl. 114—26 4 Claims

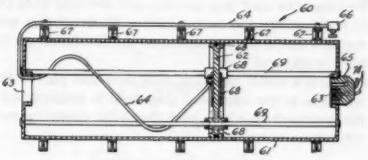


1. A barge which can be stacked on a barge-carrying ship, the framework of which comprises lower longitudinal girders and two upper longitudinal girders each consisting of a drawn section substantially of the same length as the barge, characterized in that the sections of each upper longitudinal girder and each lower longitudinal girder has hollow and projecting parts which substantially correspond to each other so that the lower longitudinal girders of the first barge can be supported and stacked along their entire length on the corresponding upper longitudinal girders of a second barge when the first barge is stacked on the second with the hollow parts of one interfitted with the projecting parts of the other, I sections which join each upper longitudinal girder to a lower longitudinal girder on the same side in relation to the interior of the barge, said I section constituting transverse frames of the barge and having external and internal wings, said frames being joined to each other by I-shaped drawn sections arranged longitudinally, characterized in that the shell of the barge is a double wall comprising an external wall and an internal wall which between them enclose a sealed buoyancy space, said walls consisting of metal sheets fixed to the external and internal wings of the I-sections and to the upper and lower longitudinal girders, each of the upper longitudinal girders has the general cross-sectional form of a recumbent letter F having a body portion and an outer bar which extends from the body portion of the F portion, the space between the two arms and of the F portion substantially cprresponding to the space between the two walls of the double wall, the part of the section formed by this body constituting a side gangway on the end of the barge, while the extension forms an edge for the gangway as well as a supporting and stacking zone for the lower longitudinal girder of a second barge stacked on the first.

3,903,823
BOAT RECOVERY SYSTEM

John R. Kennedy, Highway 34, Bloomfield, N. Mex. 87413

Continuation of Ser. No. 307,620, Nov. 17, 1972, abandoned.
This application Apr. 19, 1974, Ser. No. 462,425
Int. Cl.[2] B63B 21/52; B63C 7/08
U.S. Cl. 114—52 13 Claims



1. Apparatus for marking the location of a sunken vessel and for recovering said vessel, comprising in combination:

a. spool means for winding a cable thereon;

b. means for rigidly securing said spool means to said vessel;

c. float means attached to said cable for marking the location of said vessel after it has sunk, so that said vessel can be raised by means of said cable;

d. flotation means comprising a cylinder having an opening in one end thereof for admitting water thereto so that said flotation means may sink to the vicinity of said sunken vessel, a piston slidably mounted in the interior of the cylinder, air hose means having depth marking indicia along its length controlled from a recovery vessel for admitting air to said cylinder on the side of the piston opposite said opening in the cylinder for replacing said water with air so that said flotation means will create a buoyant effect during the recovery procedure;

e. said flotation means further comprising means engaging said cable so that said flotation means may be lowered to said sunken vessel;

f. said cylinder having cable guide means for receiving said cable from said spool means;

g. cable lock means for locking said flotation means to said cable at any desired point, including actuating means controlled from the recovery vessel, comprising a second cable linked with said cable lock means and in communication with the recovery vessel; and

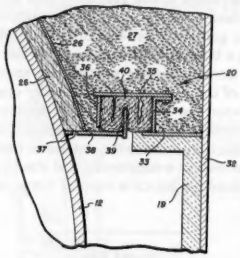
h. means for securing said air hose to said second cable.

3,903,824

LIQUEFIED GAS SHIP TANK INSULATION SYSTEM

Royce Jay Laverman, South Holland; Robert Newton Davis, Bolingbrook, and Ivan Vallier La Fave, Naperville, all of Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill.

Filed Dec. 6, 1973, Ser. No. 422,533
Int. Cl.[2] B63B *25/16*
U.S. Cl. 114—74 A **8 Claims**



2. In a ship having a hold containing at least one tank, for transporting a cryogenic liquefied gas, which is structurally free-standing and is spaced or separated from the ship hold walls, the improvement comprising:

insulation secured to the ship hold walls and hold bottom, a ship hold cover extending over the tank top portion and joined to the ship,

a layer of loose fill insulation and a resilient blanket layer between the tank top portion and the ship hold cover,

said resilient blanket and the loose fill insulation terminating at a lower edge adjacent to the insulation on the ship hold walls, and

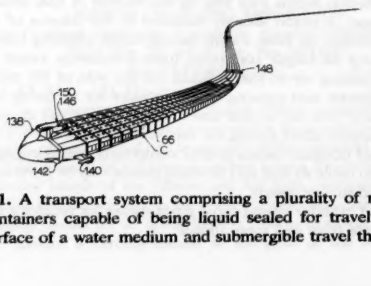
the tank is a metal spherical shell and that part of the shell which is in the insulated ship hold is uninsulated below the resilient blanket, and the hold contains no other insulation.

3,903,825

TRANSPORT SYSTEM

Norbert Hamy, Beaconsfield, Canada, assignor to Trebron Holdings Limited, Regina, Canada

Filed July 12, 1972, Ser. No. 271,033
Claims priority, application United Kingdom, July 13, 1971, 32758/71
Int. Cl. B63b *3/02*
U.S. Cl. 114—77 R **47 Claims**



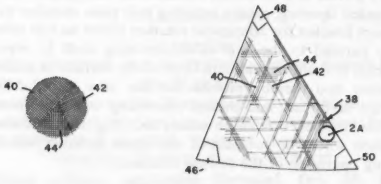
1. A transport system comprising a plurality of modular containers capable of being liquid sealed for travel on the surface of a water medium and submergible travel through a water medium, each said modular container having an interior cargo receiving cavity, means subdividing said cavity into a plurality of compartments adapted to receive various types of cargo, and at least one opening in a portion of each said modular container communicating with said cavity, at least one sub-modular container sized for disposition into each of said plurality of compartments, each of said sub-modular containers having an aperture therein for the introduction of cargo thereinto, a closure member disposable over said aperture for closing each said sub-modular container, closure means disposable over said opening in said modular containers in liquid sealingwise condition thereto, a two way coupling member adapted for operative interposition between two of said modular containers, fluid actuable lock devices associated with said coupling member and cooperatively engagable with coupling elements in said modular containers for coupling each one of said modular containers to another of said modular containers to form a chain of these containers, and power means operatively associated with said containers and adapted to transport said chain of modular containers in submergible travel through and on the surface of said water medium between two or more geopgraphic points.

3,903,826

STRETCH RESISTANT SAIL WEB

Jeff H. Andersen, Marblehead, Mass., assignor to Andersen Sailmakers, Inc., Salem, Mass.

Filed July 13, 1973, Ser. No. 378,951
Int. Cl. B63h *9/04*
U.S. Cl. 114—103 **12 Claims**



1. A stretch-resistant sail web comprising a plurality of layers of threaded material, each layer of material being stretch-resistant along at least one axis thereof and having threads aligned along said axis, said threads being substantially parallel to each other, said layers being overlayed such that the stretch-resistant axes of said layers cross at angles and which thread defining axes are aligned respectively substantially parallel with the leach, luff and foot positions of a sail.

3,903,827

NON-HEELING HULL ASSEMBLY

Paul M. Marcil, 12117 Phillips Ave., Lynwood, Calif. 90262

Filed July 15, 1974, Ser. No. 488,674
Int. Cl.[2] B63B *41/00, 15/00*
U.S. Cl. 114—143 **10 Claims**

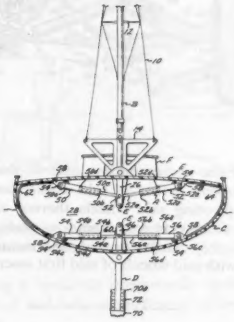
1. In a sailboat that includes a hull having a bottom and a deck and a sail-supporting mast, the improvement for permitting said boat to be wind-propelled with the sail-supporting mast being tilted transversely to either port or starboard and without said hull heeling transversely therewith, said improvement comprising:

a. a first longitudinally disposed shaft above said deck, said shaft having said sail-supporting mast rigidly secured thereto and extending upwardly therefrom;

b. a first lever secured to said shaft and extending downwardly through a transverse slot in said deck;

c. first bearing means sealingly mounted on said deck and extending over said first slot, with said first bearing means pivotally supporting said first shaft;

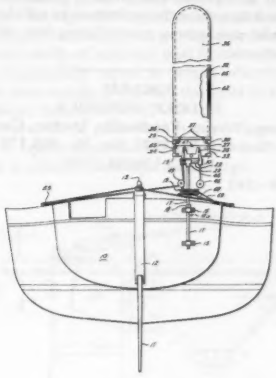
d. a second shaft longitudinally disposed under said bottom, which second shaft has first and second end portions;
e. a second lever secured to said first end portion of said second shaft and extending upwardly through a second transverse slot in said bottom;
f. second bearing means sealingly mounted on said bottom and extending over said second slot, which second bearing means pivotally supports said first end portion of said second shaft;
g. third means mounted on said bottom for pivotally supporting said second end portion of said second shaft;



h. a keel structure secured to said second shaft and depending therefrom; and
i. first transversely disposed movement-transforming means inside said hull that so operatively connect said first and second levers that pivotal movement of said mast is transferred to like pivotal movement of said keel structure but in an opposite direction, with said pivo ting of said mast and keel structure being independent of said hull, said hull remaining in a non-heeling position as concurrent pivoting of said mast and keel structure takes place.

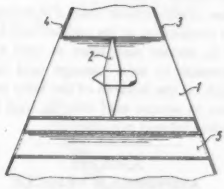
3,903,828
WIND VANE SELF-STEERING APPARATUS
William Lawrence Green, Houston, Tex., assignor to W. L. Green & Co., Inc., Houston, Tex.
Filed Feb. 11, 1974, Ser. No. 441,169
Int. Cl.[2] B63H *25/02*
U.S. Cl. 114—144 C **14 Claims**

1. Self-steering apparatus for a sailboat or the like having a tiller, comprising a horizontally pivoted vane, a horizontal pivotal mounting for said vane, a second pivotal mounting for said vane, a pair of guide members adjacent said vane and movable therewith about said second pivotal mounting, and tiller control lines connecting said vane and said tiller and passing about said guide members, said vane being shiftable about said horizontal mounting by wind action to reflect changes in orientation of the boat on which the apparatus is mounted relative to the wind direction, for actuating said lines and said tiller to compensate for such change and thereby maintain the boat on a selected course, said guide members being located side-by-side and close together and being positioned eccentrically of said second pivotal mounting to facilitate maximum rotation of said vane and said guide members



about said second pivotal mounting without fouling of said lines against said second mounting.

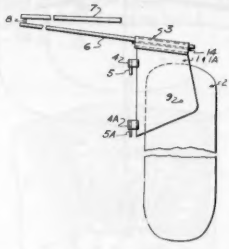
3,903,829
LATERAL THRUST CONTROL UNIT FOR WATERCRAFTS
Jochim E. Brix, Hamburg, Germany, assignor to Schottel-Werft, Josef Becker KG, Oberspay (Rhine), Germany
Continuation-in-part of Ser. No. 157,194, June 28, 1971, abandoned. This application July 19, 1973, Ser. No. 380,667
Claims priority, application Germany, July 2, 2032716
Int. Cl.[2] B63H *25/46*
U.S. Cl. 114—151 **11 Claims**



11. A lateral thrust control unit for the hull of a watercraft, comprising:
means defining at least one tunnel integral with said hull and which is directed transversely to the longitudinal axis of said watercraft, extends generally between the sidewalls of said watercraft and has propulsion means therein, said propulsion means including propeller means having an axis of rotation transverse of said longitudinal axis of said watercraft and coincident with the longitudinal axis of said tunnel means, said tunnel means having an inlet and an outlet integral with said hull and opening outwardly at the sidewalls thereof;
means defining zones of differing pressure fields created on the sidewalls of said hull of said watercraft during a longitudinal and simultaneous lateral movement of said watercraft to resist the lateral movement of said watercraft, said zones being positioned longitudinally along said sidewalls of said hull from said tunnel means; and

passageway means for connecting at least one of said zones of differing pressure fields to a pressure field of different potential to equalize the pressure differential therebetween and to reduce the resistance to said lateral movement, said passageway means being free of propulsion means therein.

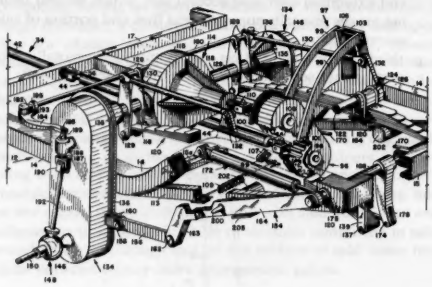
3,903,830
RUDDER ASSEMBLY
Johann Tanzer, Terrace Vaudreuille, Quebec, Canada
Filed Oct. 19, 1973, Ser. No. 408,178
Int. Cl.² B63H *25/06*
U.S. Cl. 114—162 **1 Claim**



1. A sailboat rudder, comprising:
a rudder stock having a pair of rudder cheeks fastened together by means of a pair of foreparts, each of said foreparts comprising a cheek-securing extrusion having two parallel, rearwardly open grooves adapted to hold the front edges of said cheeks and each of said foreparts also comprising a pintle and gudgeon bracket adapted to be mounted on a boat's transom; and further fastened together by means of an extruded top part having two downwardly open parallel grooves adapted to hold the top edges of said cheeks and having a cylindrical longitudinal key-shaped crossectional passage through said extruded top part;
in combination with a rudder pivotally held by a pin between said rudder cheeks;
and in further combination with a tubular tiller having a downward projection at its rudder end on the botton of said tiller to secure said tiller in said top part passage against rotation in said passage and having a spring-loaded catch on the bottom of the tiller at the rudder end of said tiller to secure said tiller in said top part passage against sliding in said passage.

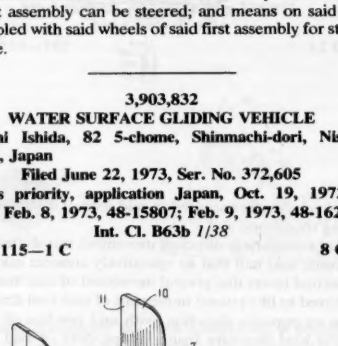
3,903,831
AMPHIBIOUS VEHICLE
Robert N. Bartlett, Atherton, and Allen R. Bartlett, San Carlos, both of Calif., assignors to Waterland Corporation, Belmont, Calif.
Filed May 14, 1973, Ser. No. 360,224
Int. Cl. B60f *3/00*
U.S. Cl. 115—1 A **33 Claims**

1. An amphibious vehicle comprising: a frame; a body mounted on said frame and having a lower portion defining a buoyant hull, whereby said vehicle is movable into and floatable on a body of water; a front wheel and axle assembly; a rear wheel and axle assembly, each of said assemblies having an axle; a pair of ground-engageable wheels, and means rotatably mounting the wheels on respective ends of the corresponding axle for movement relative to the axle from lowered ground-engageable positions beneath and generally vertically aligned with the corresponding axle to elevated, retracted positions; means coupled with each assembly, respectively, for mounting the axle thereof on said frame for up and down movement with respect thereto; means coupled with each assembly, respectively for moving the wheels thereof from said lowered positions to said elevated positions and return; a power source carried by said frame; a power transfer mechanism for connecting said power source to one of said assemblies to permit the wheels of the latter to be driven, said mechanism having means mounting the same on said frame for movement relative thereto in response to the up and down



movement of the corresponding axle as the corresponding wheels are driven, a first of said assemblies having means thereon for pivoting said wheels thereof about respective vertical axes relative to said frame, whereby said wheels of said first assembly can be steered; and means on said frame and coupled with said wheels of said first assembly for steering the same.

3,903,832
WATER SURFACE GLIDING VEHICLE
Choshichi Ishida, 82 5-chome, Shinmachi-dori, Nishi-ku, Osaka, Japan
Filed June 22, 1973, Ser. No. 372,605
Claims priority, application Japan, Oct. 19, 1972, 47-104747; Feb. 8, 1973, 48-15807; Feb. 9, 1973, 48-16259
Int. Cl. B63b *1/38*
U.S. Cl. 115—1 C **8 Claims**



1. A vehicle which can be propelled across the surface of water which comprises a vehicle hull having a central portion with a front end portion, a rear end portion, a top portion and a bottom portion, forward propulsion means provided on the top portion of the vehicle hull and a channel disposed in the rear end portion of the vehicle hull and extending through the hull from the top to the bottom thereof, said channel containing means for jetting air in the downward direction, said central portion having stationary side floats extending the entire length of the central portion and inclined portions centrally disposed therebetween, said inclined portions including a front and rear inclined portion, said front inclined portion being inclined downwardly and in the rearward direction of the vehicle hull and said rear inclined portion being inclined downwardly and in the rearward direction of the vehicle hull, said front and rear end inclined portions being separated by a step portion, said front end inclined portion and said floats defining a front zone which imparts lift to the front half of the

hull and said rear end inclined surface and said floats defining a rear zone for providing lift to the rear half of the hull by said jetting means which jets air into said rear zone.

3,903,833

THRUST PRODUCING DRIVE MECHANISM FOR WATERCRAFTS

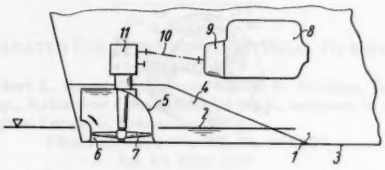
Siegfried Lais, Spay, Rhine, and Reinhold Reuter, Schwall, both of Germany, assignors to Schottel-Werft, Josef Becker KG, Spay, Rhine, Germany

Filed Mar. 29, 1973, Ser. No. 346,094

Claims priority, application Germany, Apr. 5, 1972, 2216344

Int. Cl. B63h *11/02*

U.S. Cl. 115—14 **5 Claims**



1. A thrust-producing drive mechanism for driving and controlling of watercrafts, comprising:

hull means;

means defining a vertically downwardly opening recess in the bottom of said hull means free of obstruction by said hull means;

an L-shaped elbow having a vertically oriented first part which has at its lower end an inlet opening for a stream of water, said inlet opening being approximately equal to and slightly less than the diameter of said downwardly opening recess and a horizontally oriented second part arranged at the upper end of said first part, said second part extending radially of said first part beyond the radius of said first part and having at its end an outlet opening for a stream of water opening outwardly on a plane above the plane of said inlet opening and in a horizontal discharge direction, said inlet opening being larger than said outlet opening to thereby define a nozzle at said outlet opening and a smooth curved transfer section connected between said first and second parts, said L-shaped elbow being located entirely within the contour of said downwardly opening recess, said plane of said inlet opening being positioned closely above the plane of the bottom of said watercraft;

support means for supporting said L-shaped elbow for rotatable movement about a vertical axis parallel to the vertical axis of said first part and drive means for driving said L-shaped elbow for said rotatable movement;

means defining at least one propeller mounted for rotation about a vertical axis and drive means therefor, said propeller means being mounted inside and connected to said inlet opening of said L-shaped elbow adjacent said lower end thereof, said propeller means conveying said water through said L-shaped elbow from a vertical suction direction through said smooth curved transfer section to said horizontal discharge direction.

3,903,834

HAND-DRIVEN WATER CRAFT

Luis Jorge Velandia Arevalo, Torres Los Andes, Apt. No. 6, Merida, Venezuela

Filed Oct. 4, 1973, Ser. No. 403,713

Int. Cl.² B63H *16/04*

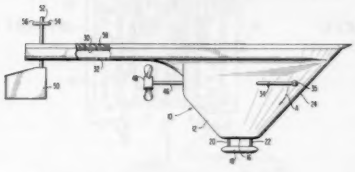
U.S. Cl. 115—24 **1 Claim**

1. A water craft comprising

a hull having first and second generally upright side walls directly joined along their lower edges to form an apex and diverging gradually therefrom to form a smooth walled, hydrodynamically streamlined, high draft structure to facilitate movement through the water and to inhibit wobbling of the craft in operation,

deck means having a front portion mounted in superposition with said hull and a rear portion extending as a cantilever rearwardly of said hull, said front and rear portions being substantially equal in length whereby said hull extends downwardly from only the front half of the craft to facilitate turning thereof,

said front portion of said deck means being contiguously joined to upper edges of said first and second side walls to form a unitary, watertight assemblage,



propulsion means including a hand crank, a crank shaft extending transversely through said hull, a propeller assembly including a drive shaft extending through a rear wall of said hull and carrying a propeller at its outer end, and means in said hull coupling rotary movement of said crank shaft to said drive shaft, and

foot controlled rudder means pivotally mounted at the rear of said deck means rear portion,

said rear portion of said deck means consisting of a hollow, watertight shell extending over the entire width of the craft to form a floatation chamber together with said front portion of said deck means and said hull.

3,903,835

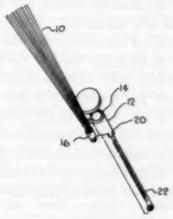
GRADE INDICATOR STAKE FLAG HOLDER

Willard D. Carroll, Abilene, Tex., assignor to Robert A. Smith, Odessa, Tex., a part interest

Filed Feb. 19, 1974, Ser. No. 443,296

Int. Cl.² G01D *21/04*

U.S. Cl. 116—114 R **7 Claims**



1. A flag holder for holding a flag made of a bundle of stiff, resilient strands comprising:

a. a strip of metal having

i. a large loop with

ii. two small loops on either side thereof

iii. side by side,

b. the small loops encircling the bundle of strands immediately adjacent to a bight in the bundle of strands,

c. the axes of the three loops pointing the same way, and

d. a wooden stake having a flat top,

e. the large loop of the flag holder driven into the flat top of the wooden stake.

3,903,836
STANDARD INDICATING DEVICE FOR VEHICLES WITH UNIVERSAL MOUNTING SYSTEM THEREFOR

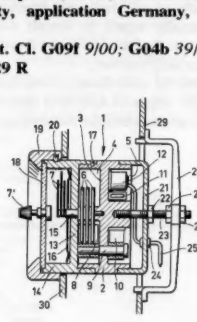
Alfred Kreidler, Zurich, Switzerland, assignor to Metall-Invent S.A., Zug, Switzerland

Filed Sept. 19, 1973, Ser. No. 398,862

Claims priority, application Germany, Sept. 19, 1972, 2245857

Int. Cl. G09f *9/00;* **G04b** *39/14*

U.S. Cl. 116—129 R **9 Claims**



1. A universal indicating device and mounting system therefor for vehicles and the like having a dashboard comprising:

a standard indicating device for vehicles and the like, such as for example a car clock, including a housing having front and rear portions with a plate therebetween and operative means, such as for example a car clock mechanism, for operating the device mounted within said housing and secured to said plate, said operative device including rotatably movable indicating means, such as for example clock hands, on a shaft, said housing further including

front locking means in its front portion for attaching a front closure element to said housing for connecting said front portion of said housing to the dashboard, said locking means including one element of a two element, mating locking system; and

a set of different front closure elements adapted for selection for mounting to said housing and having substantially different configurations and sizes but each having a rear portion which conforms to the front portion of said housing and each having complementary front housing locking means which includes the other element of said two element, mating locking system for mating in locking engagement with said front locking means, each said front closure element having a transparent shield for covering said indicating means for the viewing thereof and closing off the open front end of the selected front closure element of the housing when mounted to said housing, said indicating means mounted beneath said transparent shield and each including front dashboard mounting means for mounting it and hence said housing to the front of the dashboard; whereby said standard indicating device can be mounted to differently sized and configured dashboards without any change in the device itself but only with selecting and mounting the appropriate one of said front closure elements.

3,903,837
DIAL INDICATOR DEVICE

Dan K. Barton, 935 Graybar, Valinda, Calif. 91744, and William Weber, 2764 S. Montellano, Hacienda Heights, Calif. 91745

Filed Dec. 28, 1973, Ser. No. 429,103

Int. Cl. G09f *9/00*

U.S. Cl. 116—133 **3 Claims**

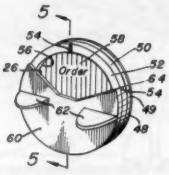
1. A dial-indicator device comprising:

an annular base member having an outwardly-extending lip member defining a recessed area, and including a central bore and an enlarged counter bore centrally disposed therein;

a dial cover rotatably secured to said base member and covering said recessed area, said cover having an opening therein whereby a selective portion of said recessed area is exposed;

a plurality of marked sections disposed within said recess, and wherein each of said marked sections is provided with a corresponding size and configuration to that of said opening in said cover;

a rotatable connecting means comprising a projecting button formed as an integral part of said cover, and having a head portion adapted to be operably received within both of said bores disposed in said base member, whereby said cover and said button rotate together with respect to said base member;



a plurality of various indicia disposed on a wall within said recessed area;

a restraining means connected between said cover and said base member, whereby said cover is held in place to expose the selective indicia through said opening in said cover,

wherein said restraining means comprises:

a plurality of notches disposed about the annular lip member; and

a plurality of corresponding teeth formed on the cover and projecting inwardly therefrom for engagement with said notches; and

a rotating means attached to said dial cover whereby said cover is rotated about said base member.

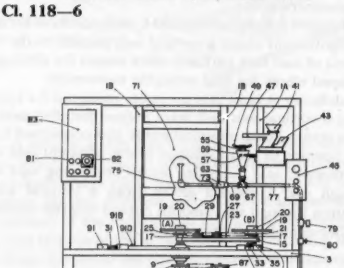
3,903,838
POWDER DISPERSION APPARATUS

Albert Bennett, Lewiston, and Glenn R. Marin, Ransomville, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed June 28, 1973, Ser. No. 374,741

Int. Cl.[2] **B05C** *5/00;* **B05B** *7/14*

U.S. Cl. 118—6 **8 Claims**



1. An apparatus for applying powdered additives to the surfaces of carbon cloth layer components of a carbonaceous article, the apparatus comprising:

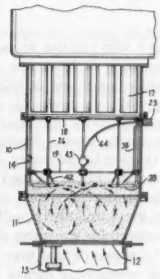
a. a frame;
b. a horizontal flat surface supported by the frame;
c. a flat movable transfer arm supported on said flat surface, the arm having at least one platen supporting the carbonaceous article;
d. a dispersion chamber supported by the frame and positioned above said platen, the chamber having an upper closed end and a lower open end above the platen;
e. a discharge tube positioned within the dispersion chamber, one end of the tube being above the platen, the other end of the tube passing through the chamber wall and having a means for charging powdered additive to the tube; and
f. means for supplying a stream of gas to the tube, whereby the additive is discharged within the dispersion chamber, the additive falling upon the carbonaceous article.

3,903,839

APPARATUS FOR APPLYING A MATERIAL TO SMALL GRANULES

Englebert L. Rowe, Portage, and Gerald R. Munting, Texas Twp., Kalamazoo County, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 12, 1973, Ser. No. 414,907
Int. Cl. B05c *5/00*
U.S. Cl. 118—9 **7 Claims**



1. In an apparatus for applying a liquid containing a binding agent, medication or other excipients to a plurality of small granules, said apparatus including a fluidized bed chamber into which ssaid granules are placed, and said chamber having an outlet for discharging the gas by which the bed is fluidized, the improvement comprising:

a source of liquid containing a binding agent, medication or other excipients;

a plurality of discharge heads supported within said chamber and located circumferentially therearound, each discharge head including nozzle means having a substantially horizontally directed discharge opening generally facing toward the central portion of the chamber for discharging therefrom a substantially horizontal stream of liquid, said heads being located near the wall defining said chamber and substantially adjacent a horizontal plane defining the upper surface of the fluidized bed when it is operative;

first conduit means connecting said source of liquid to said heads;

pressure means for selectively urging said liquid from said source into said heads and then through said discharge openings in small streams the initial parts of which are substantially horizontal;

means for cleaning said discharge heads including a plurality of nozzles supported within said chamber and spaced circumferentially therearound, one of said nozzles being located above each discharge head and being directly downwardly away from said chamber wall and having a nozzle opening spaced upwardly from the respective discharge head to direct a stream of gas downwardly onto the upper surface of the respective discharge head; and

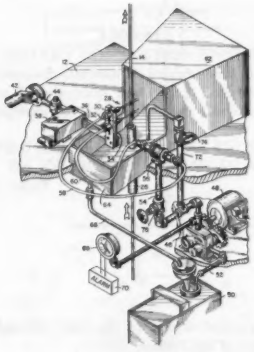
a source of gas under pressure and second conduit means connecting said source of gas to said nozzles whereby a stream of gas can be discharged from each nozzle onto the respective discharge head to prevent an accumulation of granules and/or liquid around the discharge opening in said discharge head.

3,903,840

MARKING APPARATUS

Joseph C. Gemelli, 970 Summer St., Marshfield, Mass. 02050

Continuation of Ser. No. 794,230, Jan. 27, 1969, abandoned. This application June 28, 1971, Ser. No. 153,463
Int. Cl.[2] B05C *5/00*
U.S. Cl. 118—10 **3 Claims**



1. Apparatus for marking an elongated body, at any angle to the horizontal, with separate indicia extending transversely entirely around said body comprising: a marking station; means for advancing said body through said marking station; a single nozzle mounted at said marking station for marking said body with a circumferentially complete transverse, colored band, said nozzle spaced from, but directed at, said body in a direction substantially normal to the longitudinal axis thereof; positive means for pumping marking ink through said nozzle, and means for operating said pumping means at a substantially constant rate to pump said ink at the same flow rate, at a pressure directly proportional to the ink viscosity, for any one of several viscosities of said ink, and to project a stream of said ink from said nozzle onto said body at the same velocity for each said viscosity; and means for oscillating said nozzle between a position in which said stream misses said body on one side and a position on the other side of said body which is at least to a point at which said ink can flow around said body through the combination of the velocity of said stream and the surface tension of said ink in contact with said body, thereby marking the same with spaced band-like markings.

3,903,841

VACUUM HOLDER IN EPITAXIAL GROWTH APPARATUS

Thomas E. Peters, Chelmsford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

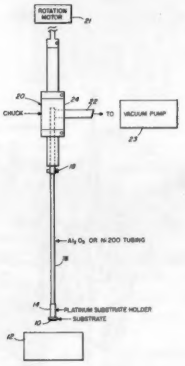
Filed Aug. 22, 1974, Ser. No. 499,752
Int. Cl.[2] B05C *3/02*
U.S. Cl. 118—50 **5 Claims**

1. An apparatus for epitaxial growth of magnetic thin film

on the substrate when the substrate is dipped into a suitable nutrient solution, including:

a. a rotary platinum substrate holder having a face adapted to contact one side of the substrate, the face having a surface area adequate to enclose the entire surface of one side of the substrate so that the side of the substrate in contact with the holder face does not contact the nutrient solution and a circular surface peripheral region of approximately 3mm which is substantially flat and bounds a central surface portion having a concavity corresponding to approximately three interference fringes when viewed under sodium light,

b. the holder further being formed with at least one opening adapted to be covered by the substrate and extending



from a central region of the face through a thickness dimension of the holder,

c. tubular means connected to the holder about said opening opposed from said face,

d. means operative through said tube for reducing the pressure in the opening after the substrate is in contact with the face to secure the substrate to the holder and for rotating the holder about an axis perpendicular to the face of the holder to reduce thickness variations of the magnetic thin film which is grown on the other side of the substrate; and

e. nutrient solution containing means operatively associated with said holder to effect said growth when the substrate is dipped therein.

3,903,842

KNIFE EDGE TEMPLATE

George W. Bowling, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Sept. 5, 1973, Ser. No. 394,583

Int. Cl.² B05B *15/04*

U.S. Cl. 118—301 **1 Claim**

1. A paint spray applicator adaptable for movement across a resilient urethane surface to provide said surface with indicia in the form of a continuous stripe, said paint spray applicator being comprised of a pair of spaced apart surface engaging discs, said discs having beveled knife edged peripheries to penetrate said urethane floor surface a distance to establish a predetermined contact length with said floor surface, said contact lengths of both said discs cooperating to define a paint spray contact area, shaft means rotatably receiving said discs, frame means supporting said shaft means, paint spray means mounted on said frame means and being adaptable to deliver a stream of paint onto said floor surface between said discs and within said paint spray contact area, said stream of paint having a width less than said contact length of said discs, and means for moving said paint spray applicator across said resilient surface.

3,903,843

COATING APPARATUS

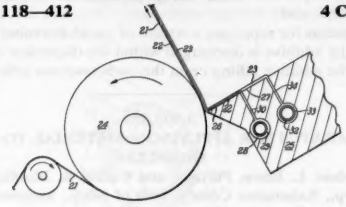
David Peter Marshall Jones, Ilford, England, assignor to Ilford Limited, Ilford, England

Filed Oct. 5, 1973, Ser. No. 403,972

Claims priority, application United Kingdom, Oct. 13, 1972, 47349/72

Int. Cl.² B05C *3/02*

U.S. Cl. 118—412 **4 Claims**



1. An apparatus for coating a travelling web with at least one layer of a photographic coating liquid, said apparatus comprising:

a hopper;

means for passing a web relative to said hopper;

said hopper comprising at least one elongated cavity for containing coating liquid and at least one elongated slot communicating with said cavity for discharging the coating liquid from said cavity onto said web; and

said at least one cavity having therein a supply tube for conveying the coating liquid under pressure from a coating liquid source to said cavity, said tube extending over substantially the entire length of said cavity, said tube having a closed inner end and a wall means consisting of a permeable material for forceably delivering the coating liquid from the interior of said tube into said cavity, and said wall means comprising means for providing a flow resistance for the coating liquid greater than the flow resistance provided by the respective slot.

3,903,844

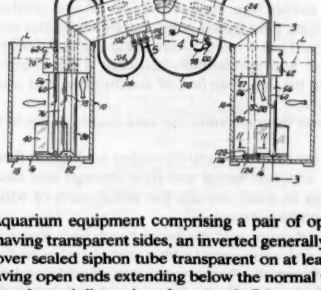
AQUARIUM EQUIPMENT

Maurice J. Greenia, 202 Piper, Detroit, Mich. 48215

Filed Aug. 15, 1973, Ser. No. 388,457

Int. Cl.² A01K *63/00*

U.S. Cl. 119—5 **7 Claims**



1. Aquarium equipment comprising a pair of open topped tanks having transparent sides, an inverted generally U-shaped cross-over sealed siphon tube transparent on at least one side and having open ends extending below the normal water level in said tanks and dimensioned to permit fish to swim through said cross-over tube from one tank to the other, separate passage means within said cross-over tube connecting said

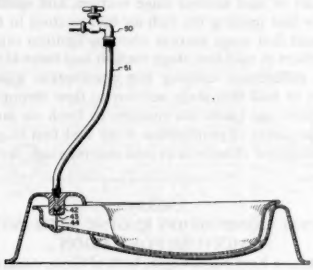
tanks, and a pump located in one tank and connected to said passage means to transfer water from one tank to the other for return to said one tank by siphon action.

3,903,845

WATER DISPENSING DISH FOR ANIMALS

Howard Little, Northridge, Calif., assignor to Howard F. Little, Northridge, Calif.

Filed June 17, 1974, Ser. No. 479,858
Int. Cl.² A01K *7/02*
U.S. Cl. 119—81 **3 Claims**



1. An automatic water dispensing dish for animals comprising:

a base having integrally formed side walls defining a receptical portion therebetween and further having a housing integrally appended thereto, said housing having an upper wall having a passageway form therethrough including an inwardly facing valve seat formed therein and means for connecting a source of water under pressure thereto;

a basin having a dish-shaped water reservoir and an integral water trough extending radially outwardly from said reservoir, said basin being pivotally connected to said base with said reservoir suspended within said base receptacle portion and said trough extending to within said base housing;

a valve slidably mounted within said base passageway for sealing engagement therewith and having a valve stem extendinto the housing portion of said base, said base and said basin having said pivotal connection selected such that a relatively small quantity of water in said basin causes the water pressure from the water source to unseat said valve, and a relatively large quantity of water in said basin causes said basin trough to move said valve into sealing engagement with said valve seat.

3,903,846

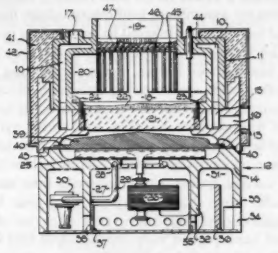
FUEL-BURNING HEATER

Douglas Ernest Elliott, 7 Kenilworth Close, Four Oaks, Sutton Coldfield, Warwickshire, and Michael John Virr, 34 Greenfinch Rd., Pedmore, Stourbridge, Worcestershire, both of England

Filed May 4, 1972, Ser. No. 250,198
Claims priority, application United Kingdom, May 4, 1971, 13869/71; May 12, 1971, 14586/71
Int. Cl. F22b *1/00*
U.S. Cl. 122—4 **14 Claims**

1. A fuel burning heater comprising a bed of refractory particles having a depth, when slumped, which is not greater than 6 inches, a pervious support underlying the bed, and feed means for feeding fuel and air into the bed, at least the air through the support, whereby the bed can be fluidised and the fuel burned therein.

13. A method of operating a heater comprising the steps of providing a bed of refractory particles having a depth when slumped not greater than 6 inches; providing pervious support underlying the bed; feeding air and fuel into the bed and at least the air through the support so that the fuel is burned in



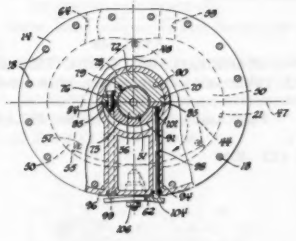
the bed at a rate such that the bed is fluidised and refractory particles are thrown upwardly from the bed and permitted to fall gravitationally back to the bed.

3,903,847

ROTARY COMBUSTION ENGINE

Richard T. Olenzek; Herman H. Petrak, both of Livonia; Carl S. Hoffman, Birmingham, and Paul J. Louzecky, Troy, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 16, 1974, Ser. No. 497,870
Int. Cl.² F02B *53/00;* **F16H** *55/14*
U.S. Cl. 123—8.07 **6 Claims**



1. A rotary combustion engine comprising housing means having at least two cavities with peripheral walls having a common major axis and a common minor axis, said housing means including an intermediate housing between one side of each cavity and outboard located housings on the other sides of said cavities, a one-piece crankshaft having an eccentric located in each said cavity, said crankshaft further having at least three main journals with one of said main journals located between said eccentrics and the other main journals located on the other sides of said eccentrics, bearing means rotatably supporting said crankshaft at each of said other main journals in said outboard located housings, a rotor rotatably mounted on each said eccentric, said rotors having concentrically arranged rotary phasing gears that rotate therewith with at least one of said rotary phasing gears on one of said rotors located adjacent said intermediate housing, an annular stationary phasing gear received about said crankshaft and secured to one of said outboard located housings and meshing with the other of said rotary phasing gears, and split carrier-bearing-gear means mounted about said crankshaft and between said eccentrics in said intermediate housing, said split carrier-bearing-gear means comprising an annular carrier with concentric inwardly and outwardly facing inner and outer cylindrical surfaces and an integral concentric stationary phasing gear at one end, said carrier being split into two halves along a longitudinal plane in which the center line of said carrier lies, a cylindrical bearing split into two halves along a

longitudinal plane in which the center line of said bearing lies, each said bearing half mounted on the inner cylindrical surface of one of said carrier halves, said inner cylindrical surface sized to provide a crush fit on said bearing halves when said carrier halves are assembled, said intermediate housing having a cylindrical mounting hole sized to permit free passage of said eccentrics and provide a close fit with said outer cylindrical surface of said carrier halves, bolts for bolting said carrier halves together with said bearing halves in place about said one main journal while said one main journal is located to one side of said intermediate housing, said outer cylindrical surface of said carrier having a peripherally extending reduced radius portion on only one of said carrier halves to permit the assembled carrier halves to be inserted into said mounting hole and said integral stationary phasing gear brought into mesh with said one rotary phasing gear after one of said eccentrics has first been passed therethrough and said intermediate housing and said crankshaft are turned in a threaded manner relative to each other, and a pair of nesting dowels mounted in parallel guide holes in said intermediate housing at right angles to said major axis and in the direction of the major combustion gas pressure force transmitted by said rotor to said crankshaft, said nesting dowels at their inner ends received in pockets in said one carrier half located at equal distances from and on opposite sides of said minor axis, and means for engaging the outer ends of said nesting dowels so that said dowels are loaded in compression and locate the split of said carrier in line with said major axis and hold said outer cylindrical surface of said carrier on the other carrier half in position against the wall of said mounting hole in said intermediate housing to receive the combustion gas pressure force while permitting slight angular movement of said carrier and thus said integral stationary phasing gear to dampen gear tooth shock loading.

3,903,848

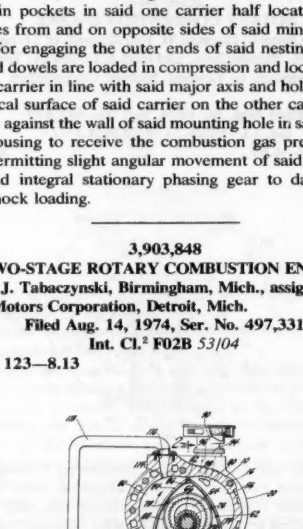
TWO-STAGE ROTARY COMBUSTION ENGINE

Rodney J. Tabaczynski, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 14, 1974, Ser. No. 497,331

Int. Cl.[2] F02B *53/04*

U.S. Cl. 123—8.13 **3 Claims**



1. A two-stage rotary combustion engine comprising a first stage section and a second stage section, each said section having a rotatably supported rotor with a plurality of chambers thereabout that expand and contract while moving with said rotor as said rotor rotates, each said section also having an intake port that opens to the chambers in this section as they expand during an intake phase, each said section also having an exhaust port that opens to the chambers in this section as they contract during an exhaust phase, the chambers in said first stage section being substantially smaller than the chambers in said second stage section, means drivingly connecting said rotors so that the chambers in said sections are phased in pairs that simultaneously expand and contract, a jet ignition port that connects the phased pairs of the chambers in said sections only as they contract and then expand in a compression phase and a power phase respectively, rich air-fuel supply means for supplying a rich air-fuel mixture to the intake port of said first stage section, fresh air supply means for supplying fresh air to the intake port of said second stage section, gas transfer passage means for delivering all the products of combustion exhausted from the exhaust port of said first stage section to mix with the fresh air supplied to the intake port of said second stage section, and spark ignition means for first igniting the rich air-fuel mixture in the chambers in said first stage section whereby ignition originates in the chambers in said first stage section and there is effected a pressure differential causing hot combustion gases in the chambers in said first stage section to flow through said jet ignition port and ignite the mixture of fresh air and the exhausted products of combustion from said first stage section in the associated chambers in said second stage section.

3,903,849

INTERNAL COMBUSTION ENGINE WITH INTERNAL MIXTURE FORMATION

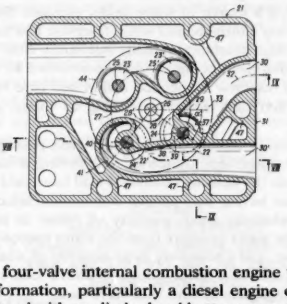
Hans List, and Karl Kirchweger, both of Graz, Austria, assignors to Hans List, Graz, Austria

Filed May 10, 1973, Ser. No. 358,951

Claims priority, application Austria, May 10, 1972, 4111/72; June 20, 1972, 5307/72; Sept. 15, 1972, 7965/72; Sept. 15, 1972, 7963/72

Int. Cl. F02f *1/42*

U.S. Cl. 123—30 C **3 Claims**



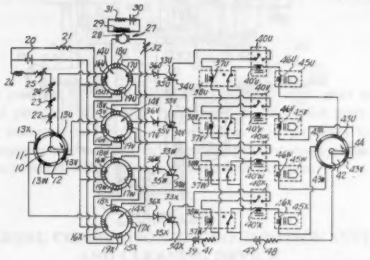
1. In a four-valve internal combustion engine with internal mixture formation, particularly a diesel engine comprising a cylinder head with a cylinder head bottom, a suction end wall and an exhaust end wall and two inlet ducts for the air for combustion, both said ducts extending through said suction end wall, a first intake valve arranged in the cylinder head and having an axis located in a first plane including the cylinder axis, a second intake valve arranged in the cylinder head and having an axis located in a second plane including the cylinder axis and forming an angle of approximately 90° with the first mentioned plane, the first said inlet duct designed as an inclined duct extending through said suction end wall to the first said intake valve, the second said inlet duct being designed as a spiral duct extending through said suction end wall to the second intake valve, the combination of features in accordance with which: the first intake valve is in advance of the second intake valve when viewed in the main direction of rotational flow in a horizontal cross-sectional view of the cylinder head; the first said plane including the cylinder axis and the first intake valve forming an acute angle in the direction of main rotational flow of a maximum of 45° with a reference plane including the cylinder axis and arranged in vertical relation to the said suction end wall of the cylinder head; the two inlet ducts extending substantially in tangential relation to

a cylindrical surface located in concentric relation to the cylinder axis and including the axes of the two intake valves.

3,903,850
FUEL INJECTING SYSTEMS FOR INTERNAL COMBUSTION ENGINES

Souichi Hisada, Sun-Lemon Bldg., 2-chome 11-2, Nagoya, and Taro Sometani, Koto cho 1487-45, Hamamatsu, both of Japan

Filed June 12, 1973, Ser. No. 369,294
Claims priority, application Japan, June 15, 1972, 47-59901
Int. Cl. F02b *3/00*
U.S. Cl. 123—32 EA **14 Claims**



1. A fuel injecting system for an internal combustion engine, a throttle-resistor adapted to have a variable resistance in accordance with the opening angle of a throttle valve; used together with an engine having cylinders, an intake pipe and a throttle valve, comprising: pulse transformers each of them having a saturable magnetic core of a rectangular hysteresis loop, an input-winding; a bias-winding; a speed-winding; and an output-winding; switching elements connected so as to be turned on by the output of said pulse tranformers, the number of said switching elements being equal to that of the engine-cylinders; an inductor; a negative pressure-resistor adapted to have a resistance variable in accordance with the negative pressure in the intake pipe; a successively operating switching having pairs of electrodes of a number equal to that of the engine-cylinders and adapted to close or open according to the rotation of the engine, said inductor, said negative pressure-resistor and said successively operating switch all being connected in series to said input-winding; said bias winding being connected so as to be energized with direct current; a d.c. source adapted to generate a D.C. voltage variable with the r.p.m. of the engine; a throttle-resistor adapted to have a resistance variable in accordance with the opening angle of the throttle valve of the engine, said speed-winding being connected to said d.c. source through said throttle-resistor; and fuel injection valves or nozzles of a number equal to that of the engine-cylinder, the energizing circuit for the injection valves being closed by said successively operating switch in accordance with the rotation of the engine and being opened by the current flowing in said switching elements and the circuit including said switching elements being opened as the result of the deenergization of said fuel injection valves.

3,903,851
CONTAINERIZED PRODUCTION OF POULTRY

Robert L. Van Huis, Zeeland, Mich., assignor to U.S. Industries, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 786,177, Dec. 23, 1968, Pat. No. 3,593,689. This application May 23, 1969, Ser. No. 827,220
Int. Cl.[2] A01K *31/00*
U.S. Cl. 119—18 **8 Claims**

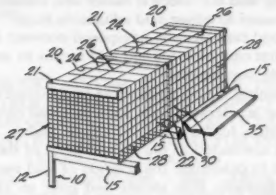
1. The process of containerized production of poultry comprising:

inserting a newly hatched chick into a cage which is constructed to retain and accommodate birds for feeding and watering from newly hatched chicks of small size to mature birds;

shipping the chick with said cage to a grower;

providing feed and water for the chick in said cage;

conveying feed along the outside of said cage in a trough so as to define a feeding side;



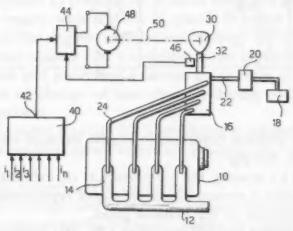
enlarging the size of the mesh at the feeding side of said cage at at least one stage in the growth of the bird by rotating the cage 90° so as to present at the feeding side a mesh having larger openings, which theretofore had formed the top side of the cage, whereby the bird is able to continue reaching the feed in the trough even though its body has grown too large for the mesh opening prior to the enlargement of the same; and

retaining the chick in said cage until maturity.

3,903,852
FUEL INJECTION PLANT FOR INTERNAL COMBUSTION ENGINES

Alberto Sola, Turin, Italy, assignor to Fiat Societa per Azioni, Turin, Italy

Filed Oct. 24, 1973, Ser. No. 409,206
Claims priority, application Italy, Oct. 24, 1972, 70343/72; June 14, 1973, 68748/73; June 14, 1973, 68749/73
Int. Cl. F02d *1/04, 1/06;* **F02b** *3/00*
U.S. Cl. 123—32 EA **4 Claims**



1. An injection unit for injecting fuel, in particular gasoline, into an internal combustion engine, with a pump means to supply the fuel to a rotary distributor means from which it is discharged intermittenly to the cylinders of the internal combustion engine and which includes a fuel metering device with a freely displaceable metering plunger means, the travel of which is controlled by an adjustable stop means, and with means to adjust said adjustable stop means, comprising:

a. a plurality of sensing means which are responsive to parameters which are representative of the functioning of said internal combustion engine or influence said functions;

b. transducer means associated with corresponding sensing means for converting said parameters into electric signals;

c. an electronic control device electrically connected to said transducer means to which said signals are applied and

which supplies at its output analogous signal proportional to said parameters;

d. a comparator circuit having a first input to which said analogous signal is applied, a second input, and an output;

e. a d.c. electric motor electrically connected to the comparator circuit output and controlled by said comparator circuit;

f. a first cam element mechanically connected to and actuated by said d.c. electric motor and located adjacent to said means to adjust said adjustable stop;

g. a second cam element interposed between and engaging said first cam element and said means to adjust said adjustable stop means;

h. mechanical means connecting said second cam element with an accelerator pedal such that said cam is moved in proportion to the pedal movement; and

i. means connected to the second input of the comparator circuit to determine the position of said means to adjust the adjustable stop means and emit an electric signal corresponding to said position.

3,903,853
EXHAUST EMISSION CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINES

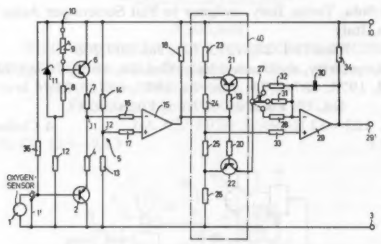
Harald Kizler, and Peter Jürgen Schmidt, both of Schwieberdingen, Germany, assignors to Robert Bosch G.m.b.H., Gerlingen-Schillerhohe, Germany

Filed Dec. 13, 1973, Ser. No. 424,621

Claims priority, application Germany, Jan. 12, 1973, 2301353

Int. Cl.² F02B *3/00*

U.S. Cl. 123—32 EA **15 Claims**



1. In an internal combustion engine exhaust emission control system, having

means (1) sensing the composition of exhaust gases and providing a sensed electrical signal representative of the composition of the exhaust gases,

an integrating control amplifier (29, 30) providing an output signal (29′) which is available to command the relative mass ratio (λ) of air and fuel being applied to the engine,

and a connection circuit connecting the sensing means and the integrating control amplifier,

the improvement wherein the connecting circuit comprises a bridge circuit (5), said sensing means (1) being connected to one branch of the bridge circuit to provide the sensing signal thereto;

a reference source (6, 7, 8, 9, 11) connected into another branch of the bridge circuit and providing a reference signal, with respect to said sensing signal, the other branches of the bridge circuit being formed by balanced impedances (13, 14);

and an operational amplifier (15) having its respective inverting and direct inputs connected across the diagonal junctions (J1, J2) of the bridge circuit to provide an output signal representative of deviation of the sensed signal from the reference signal.

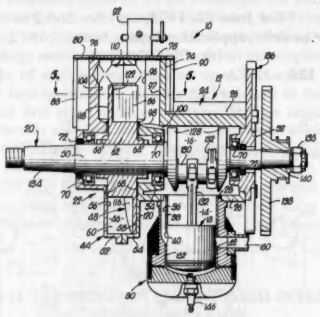
3,903,854
TWO-CYCLE INTERNAL COMBUSTION ENGINE WITH PUMP MEANS

Luther L. Shelton, Kansas City, Mo., assignor to Industrial Research Company, Kansas City, Mo.

Filed Jan. 24, 1974, Ser. No. 436,137

Int. Cl.² F02B *75/02*

U.S. Cl. 123—65 B **2 Claims**



1. A two-cycle internal combustion engine comprising in combination:

a block assembly presenting a plurality of cylinders and an undivided crankcase common to all cylinders;

a piston unit for each cylinder;

a crankshaft disposed in said crankcase and operably coupled with said pistons;

each cylinder being provided with a fuel inlet and an exhaust outlet;

said block assembly further including a positive displacement pump means integral therewith,

said pump means having a pressure chamber separate from said crankcase and including a rotary piston in said chamber coupled to said crankshaft for rotation about a common axis therewith,

said chamber being in continuous flow communication with the fuel inlet of each cylinder;

means for providing a premixed fuel and air supply to said pump means whereupon said mixture is pressurized in said chamber and uninterruptedly supplied to each inlet under substantially uniform pressure; and

means for combusting said mixture when admitted into said cylinders through said inlets.

3,903,855
AUXILIARY INTAKE VALVE

Thomas J. Klakulak, Warren, and Edward D. Klomp, Mt. Clemens, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

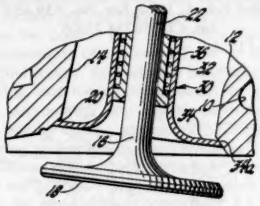
Filed Sept. 28, 1973, Ser. No. 401,588

Int. Cl.² F01L *9/02*

U.S. Cl. 123—90.14 **4 Claims**

3. An intake valve structure in an internal combustion engine having a cylinder and a cylinder head with an induction passage therein, said induction passage terminating at an inlet port with an annular valve seat therein adjacent to said cylinder, said intake valve structure including an intake poppet valve having a stem and an annular head concentric therewith, said head having an annular seating portion of a complementary shape to the valve seat in the inlet port, said stem being slidably journaled in said cylinder head with the free end thereof extending outward from said cylinder head for actuation by a valve actuator mechanism including a cam whereby said intake poppet valve can be reciprocated in timed operation to the operation of other components of the engine between a position in which said seating portion of said head is

in sealing engagement with said valve seat to a position in which said head is unseated with respect to said valve seat, an auxiliary intake valve means adapted to be positioned upstream of said head of said intake poppet valve in the induction passage for movement relative to said valve seat between



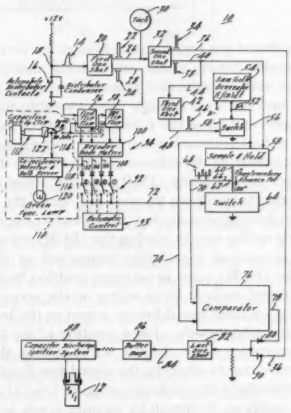
a first position to block flow through said inlet port and a second position to permit flow through said inlet port and, spring means operatively connected to said auxiliary intake valve means and to said cylinder head to normally bias said auxiliary intake valve means to said first position.

3,903,856

INTERNAL COMBUSTION ENGINE IGNITION SYSTEM AND CLEANING DEVICE

John A. McDougal, Flint, and John W. Lennington, Ypsilanti, both of Mich., assignors to Linayer Corporation, Detroit, Mich.

Filed Feb. 28, 1973, Ser. No. 336,559
Int. Cl. F02p *5/04*
U.S. Cl. 123—117 R **47 Claims**



1. In an engine having a predetermined operating cycle and including wall means defining a plurality of combustion chambers and respective igniting means associated with respective ones of said plurality of combustion chambers for igniting a charge in each of said plurality of combustion chambers when energized, a system for controlling the timing of the ignition of the charge for said each of said plurality of combustion chambers by said respective igniting means comprising:

energizing means adapted to be connected to said respective igniting means for energizing the igniting means associated with one of said plurality of combustion chambers in response to a first signal and for energizing the igniting means associated with another of said plurality of combustion chambers in response to a second signal;

first timing means responsive to the operating cycle of said engine for providing said first signal to said energizing means to establish a first predetermined ignition timing relationship with respect to said operating cycle for one of said plurality of combustion chambers; and

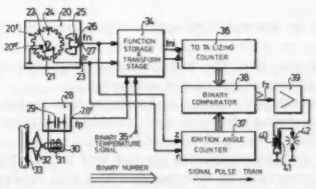
second timing means responsive to the operating cycle of said engine for providing said second signal to said energizing means to establish a second predetermined ignition timing relationship with respect to the operating cycle for another of said plurality of combustion chambers, said second predetermined ignition timing relationship being different than said first predetermined ignition timing relationship.

3,903,857

DIGITAL TRIGGER SYSTEM TO CONTROL TIMING OF A CONTROLLED EVENT WITH RESPECT TO OPERATION OF AN APPARATUS, PARTICULARLY DIGITAL IGNITION TIMING CIRCUIT FOR INTERNAL COMBUSTION ENGINES

Günter Hönig, Markgroningen, and Alfred Schulz, Braunschweig, both of Germany, assignors to Robert Bosch G.m.b.H., Gerlingen-Schillerhohe, Germany

Filed Oct. 17, 1974, Ser. No. 515,696
Claims priority, application Germany, Oct. 20, 1973, 2352694
Int. Cl.[2] F02P *3/02*
U.S. Cl. 123—117 R **33 Claims**



1. Digital timing system to control the timing of a controlled event with respect to elements which move in an apparatus, upon operation thereof, to provide a timing trigger output signal, particularly to control the ignition timing of an internal combustion engine with respect to speed, or other operating parameters of the engine, said system having

a pulse train source (**20'**) coupled to an element of said apparatus and providing a sensed pulse train (*fn*) representative of change of said element during operation of the apparatus;

a reference pulse source (**20''**) providing a reference pulse (*fr*) at a predetermined reference position of a reference element;

wherein the improvement comprises

a function storage and transform stage (**34**) storing the transfer characteristic between change in position of the apparatus element and the resulting change in timing of the trigger signal with respect to the reference position, connected to and having said pulse train (*fn*) applied thereto and generating a modified pulse train (fnvi) at a frequency which determined by the stored transfer characteristic relating the relative changes of position and change in timing;

a reversible counter (**36; 68–70**) having said modified pulse train applied thereto;

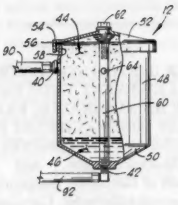
a change-of-position counter (**37**) having a count input terminal (*z*) connected to the pulse train source (**20**) and a reset terminal (*r*) connected to the reference pulse source (**20''**) to reset the counter and then commence a counting cycle at said sensed pulse train rate;

and a binary comparator connected to both the reversible counter (**36; 68, 70**) and to the change of position counter (**37**) and generating a trigger signal when the count states of said counters have reached a predetermined relative relationship.

3,903,858
CRANKCASE FUMES TREATMENT

Victor Hecht, Haysville, Kans., assignor to C. Wayne Stearns, Haysville, Kans.

Filed Apr. 23, 1973, Ser. No. 353,904
Int. Cl. F02m 25/06
U.S. Cl. 123—119 B 1 Claim



1. In an internal combustion engine having a crankcase or the like, an intake manifold or the like and an exhaust manifold or the like, the improvement therewith of crankcase fumes treatment apparatus, comprising:

a. a crankcase vapors trap having an inlet and an outlet, said trap being a sealable and openable container and having a liquid storage reservoir therein,

b. a conduit connected on one end to said trap inlet and connectable on its other end with said crankcase in fluid communication therewith,

c. a heat exchanger means having a conduit mounted in said exhaust manifold and having an inlet and an outlet,

d. a second conduit connected on one end to said trap outlet and connected on its other end to said heat exchanger inlet,

e. a third conduit connected on one end to said heat exchanger outlet and connected on its other end to said intake manifold in fluid comunication therewith, and

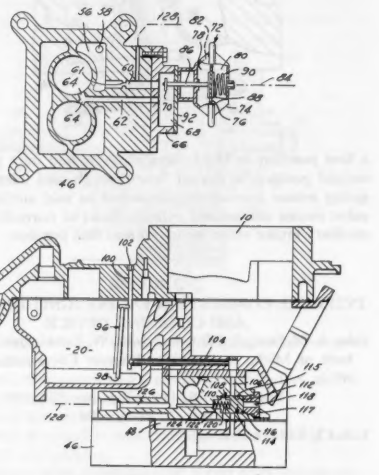
f. means with said crankcase vapors trap to separate liquid and gaseous fluids.

g. said heat exchanger has a conduit member secured therewith and extending therethrough, said conduit heated by direct heat exchange with exhaust gases from said engine, said trap has an upper cavity portion having said inlet thereinto and an outlet therefrom and a lower cavity portion to temporarily store liquid therein, and said heat exchanger conduit extends through a mid-portion of said exhaust manifold and is positioned so exhaust gases will flow around same, said trap has an upright sidewall with an integrally attached bottom, said inlet of said trap is through said side wall, said outlet of said trap is through said bottom and has an upright conduit member in said container extending upwardly from said bottom outlet through said lower cavity portion, said upright conduit having an inlet into same from said upper cavity portion, said crankcase fumes treatment apparatus being constructed and adapted to in use receive vapors from said crankcase through said first-named conduit, pass said vapors through said crankcase vapors trap and said means to separate liquid and gaseous fluids wherein liquid portions of said vapors are separated fron gaseous portions thereof and resulting vapors are passed to said heat exchanger means via said second conduit, said heat exchanger means substantially heating said resulting vapors and passing same into said intake manifold via said third conduit and resulting liquid is stored in said reservoir.

3,903,859
SUPPLEMENTAL FUEL SYSTEM FOR EXHAUST GAS RECIRCULATING SYSTEM

Charles F. Aquino, Ann Arbor, and Melvin F. Sterner, Bloomfield Hills, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Feb. 4, 1974, Ser. No. 439,457
Int. Cl.² F02M 25/06
U.S. Cl. 123—119 A 9 Claims



1. An exhaust gas recirculating system for an internal combustion engine having intake and exhaust manifolding and a carburetor with an induction passage connected to the intake manifold and having a throttle valve movable across the passage to open and close the passage to control the flow therethrough, a duct connecting the intake and exhaust manifolding for recirculating the exhaust gases back into the engine, an exhaust gas recirculating (EGR) control valve movable between alternate positions to open and close the duct, a vacuum servo having an actuator connected to the (EGR) valve and having spring means biasing the (EGR) valve to a closed position, a vacuum signal line connected to the servo for moving the (EGR) valve to an open position in response to a predetermined vacuum force acting on the servo, means connecting the vacuum signal line to a port in the induction passage located adjacent the closed position of the throttle valve to be traversed by the throttle valve during throttle valve opening movements whereby the signal line fluid force varies from an essentially atmospheric pressure level at closed throttle valve positions to manifold vacuum levels in response to the throttle valve moving above the port, and fuel supply means connected to the intake manifold to supply fuel into the duct in response to opening of the (EGR) valve providing flow of exhaust gases through the duct.

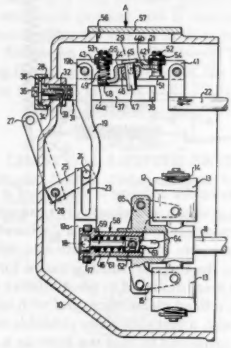
3,903,860
CENTRIFUGAL RPM GOVERNOR FOR FUEL INJECTED INTERNAL COMBUSTION ENGINES

Sieghart Maier, Stuttgart-Feuerbach, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed July 5, 1974, Ser. No. 486,157
Claims priority, application Germany, July 7, 1973, 2334729
Int. Cl. F02d 1/04
U.S. Cl. 123—140 R 21 Claims

1. In a centrifugal r.p.m. governor for fuel injected internal combustion engines, including a housing mounting therein:

centrifugal weight means; an adaptor sleeve slidably displaceable under the influence of the centrifugal weight means and as a function of engine r.p.m.; a fuel quantity control rod; an intermediate lever; means connecting the intermediate lever to the control rod; operating lever means having a pin which engages the intermediate lever, the operating lever means displacing, by said pin, the intermediate lever to thereby arbitrarily move the control rod; an adaptor mechanism which limits the movement of the control rod in the direction of increasing fuel supply, said adaptor mechanism including an adaptor spring, stop means adjustable in the direction of the control rod, and counter stop means mounted to the connecting means; and an energy accumulator having a spring, said adaptor spring and said accumulator spring being tensed as soon as and for so long as the intermediate lever tends to move the control rod beyond a position determined by the adaptor mechanism, the improvement comprising:



a. pivot means;
b. a first set screw;
c. path-limiting means; and
d. a stop member,

wherein:

said connecting means comprises a connection member to which one end of said adapter spring is attached;

said first set screw and said path-limiting means being mounted to said connecting member;

said counter stop means includes said stop member and a rocker arm which is mounted by said pivot means to said connecting member, said rocker arm being pivotable about an axis defined by said pivot means within an angular sector which is limited by said first set screw and said path-limiting means, and having the other end of said adaptor spring attached thereto, and

said stop member is mounted to said rocker arm in the vicinity of said pivot axis to extend perpendicularly with respect to the pivot axis and so that it can engage said stop means.

3,903,861

ELECTRONIC CIRCUIT BY WHICH ELECTRIC CURRENT IS FED TO SPARK PLUGS OF AN ENGINE

Enio Di Cecco, Milan, and Mario Totti, Rozzano, both of Italy, assignors to Safe Electronic Systems A.G., Mauren, Liechtenstein

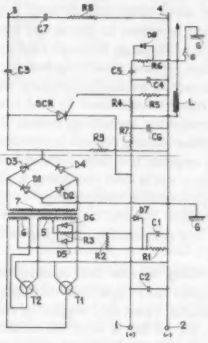
Filed Apr. 3, 1973, Ser. No. 347,489

Claims priority, application Italy, June 23, 1972, 26144/72

Int. Cl.[2] F02P *3/06*

U.S. Cl. 123—148 E **5 Claims**

1. In an electronic circuit for the operation of engine spark plugs, comprising a feeder-booster, a capacitive discharge circuit connected to said feeder-booster and in turn adapted for connection with an H.V. coil of an electric circuit through which power is fed to the spark plugs, said capacitive discharge circuit including an SCR diode, said feeder-booster being adapted for connection to a direct current source, an improvement wherein said feeder-booster comprises a pair of transistors, a pair of resistors (R_1) and (R_2) and a capacitor (C_1) connected to the bases of said transistors to bias the same, lead-in wires adapted for connection with the direct current source, a resistor (R_3) in series connection with one said lead-in wire and having a value in the range of about 0.05 to 8Ω, at least one diode (D_5 or D_6) connected in parallel with



said resistor, a transformer connected to said transistors and adapted for connection to said direct current source via said resistor and diode, said transformer having a ratio of primary winding to reaction winding in the range of about 1.6/1 and 2.7/1, the values of the two resistors (R_1 and R_2) and the capacitor (C_1) which bias the bases of said transistors being 200–2000 Ω for resistor R_1, 10-56Ω for resistor R_2, and 1-8 mfd for the capacitor (C_1) and a second diode (D_7) connected between the lead-in wire connected to the positive pole of the direct current source and the set consisting of said two resistors (R_1) and (R_2) and said capacitor (C_1).

3,903,862

CAPACITOR DISCHARGE TYPE CONTACTLESS IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES

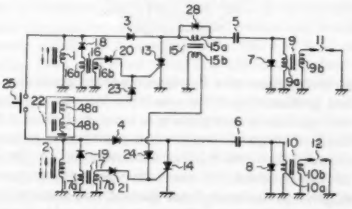
Masao Nagasawa, Kariya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed June 27, 1973, Ser. No. 374,097

Claims priority, application Japan, June 29, 1972, 47-65674; July 31, 1972, 47-90650; Feb. 27, 1973, 48-25508; Mar. 13, 1973, 48-31381; Mar. 15, 1973, 48-31852; Mar. 20, 1973, 48-34285; Mar. 27, 1973, 48-37390

Int. Cl. F02p *1/00*

U.S. Cl. 123—148 E **20 Claims**



1. In a capacitor discharge type contactless ignition system for an internal combustion engine, used with a magneto generator, comprising:

charging circuit means including capacitor charging coil means coupled to a magneto generator for generating an

alternating current signal during rotation of said magneto generator, rectifying means for rectifying said alternating current signal of said capacitor charging coil means to produce halfwaves and a capacitor, said coil means rectifying means and capacitor being connected in series to permit current flow from said capacitor charging coil means through said rectifying means and said capacitor, discharging circuit means connected to said capacitor including semiconductor switching means having a control electrode and a primary winding of an ignition coil having said primary winding and a secondary winding, said capacitor switching means and primary winding being connected in series to cause the stored charge on said capacitor to discharge through said primary winding upon conduction of said switching means;

a spark plug connected to said secondary winding; and

ignition control means connected to said control electrode of said semiconductor switching means for sequentially generating ignition timing signals in synchronism with the rotation of an engine, the time between adjacent timing signals defining a cycle and including a plurality of halfwaves, the improvement comprising;

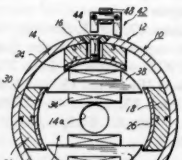
bypassing conduction means connected to said charging circuit means for preventing charging of said capacitor; and

bypassing controlling means for causing said alternating current to by-pass said capacitor through said bypassing conduction means, when said engine is rotating in a normal direction, for all but a selected number less than all of half-waves of said alternating current signal, which will otherwise charge said capacitor, and which are produced by said capacitor charging coil means after said ignition timing signal during each cycle, said cycle having a duration from a certain ignition timing signal to the next ignition timing signal and starting from the point where said capacitor begins charging.

3,903,863
SIGNAL SOURCE IN USE FOR A BREAKERLESS IGNITION SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Mitsuo Katsumata, Numazu, Japan, assignor to Kokusan Denki Co., Ltd., Numazu, Japan

Filed Dec. 27, 1973, Ser. No. 428,716
Claims priority, application Japan, Dec. 29, 1972, 47-1551
Int. Cl.[2] F02P *1/02*
U.S. Cl. 123—149 D **7 Claims**

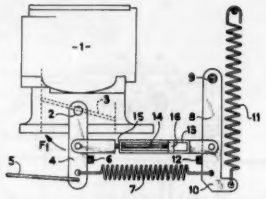


1. In a combination of a flywheel magneto generator for a breakerless ignition system for use in an internal combustion engine, said generator comprising a rotor including a bowl-like flywheel of magnetic material, a plurality of permanent magnets spaced from each other and mounted on the inner surface of said flywheel and respective pole pieces mounted on said magnets at the inner faces thereof, and a stator including generating coil means disposed inside said rotor and closely spaced from said pole pieces of said rotor, a signal source comprising at least one of said permanent magnets on said flywheel, magnetically conducting means having one end directly connected to said pole piece on said one permanent magnet and the other end exposed at the outer periphery of said flywheel and magnetically insulated therefrom, and signal coil means disposed outside said flywheel and in a closely spaced relationship with said outer periphery of said flywheel and said exposed end of said magnetically conducting means.

3,903,864
CONTROL DEVICE IN PARTICULAR FOR A CARBURETTER THROTTLE

Robert Beaumont, Acheres, and Bernard Bertrand, Aubergenville, both of France, assignors to Automobiles Peugeot, Paris and Regie Nationale des Usines Renault, Boulogne-Billancourt, both of, France

Filed May 21, 1973, Ser. No. 362,289
Claims priority, application France, May 31, 1972, 72.19463; Dec. 27, 1972, 72.46313
Int. Cl. F02b *77/00*
U.S. Cl. 123—198 DB **10 Claims**



1. A control device for moving a throttle of a carburetter away from a given position and elastically returning the throttle to said given position, comprising a carburetter body, a control element movably mounted relative to said body and connected to move the throttle, shifting means for shifting the control element, a lever mounted to pivot relative to said body about a pivot axis, a fixed element integral with said body and defining an abutment, a first elastically yieldable return means connected to the lever and to bias the lever in a direction to apply the lever against the abutment, the lever having a first portion which is normally disposed between the first return means and the fixed element and a second portion, a second elastically yieldable return means connected to the lever and disposed relative to the lever to act in a line which normally passes near said pivot axis, and lost-motion connecting means operatively connected, to act in parallel with the first return means, to the control element and to the lever, the second portion of the lever being part of the lost-motion connecting means, said lost motion connecting means for operatively connecting the second return means to the throttle when the first return means fails.

3,903,865
AIR POPPER

Hitoshi Kaneko, Uwajima, Japan, assignor to Kaneko Company, Uwajima, Japan

Continuation-in-part of Ser. No. 478,869, June 13, 1974, abandoned. This application Jan. 10, 1975, Ser. No. 540,143
Claims priority, application Japan, June 19, 1973, 48-72689
Int. Cl.[2] F41F *1/04;* **A63H** *35/00, 29/16*
U.S. Cl. 124—11 R **11 Claims**

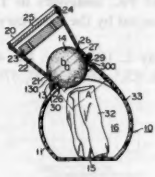
1. An air popper comprising:

a. a hollow body comprising a hollow deformable drum portion provided with an air chamber therein, a hollow deformable funnel-shaped projecting portion communicating at the smaller diameter end with the air chamber and at the larger diameter end with the atmosphere, and a neck portion having a circular cross section and a concave inner annular wall and formed between the drum portion and the projecting portion, said neck portion widening to a central area having the largest inner diameter and the largest outer diameter thereof;

b. a spherical shot member having a maximum diameter slightly larger than said largest inner diameter of said

neck portion so as to be held airtight on the inner annular wall of the neck portion; and

c. a substantially rigid ring member positioned between said drum portion and said central area of said neck portion, said rigid ring member having an inner diameter of such a size that when said shot member is placed in said neck



portion, said rigid ring member contacts said outer surface of said neck portion and is also smaller than said largest outer diameter of said neck portion so as to prevent the formation of air gaps between the inner annular wall and the shot member when the shot member is placed on the inner annular wall.

3,903,866

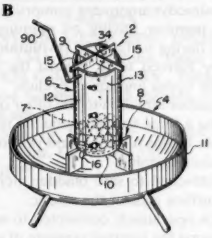
CHARCOAL LIGHTER DEVICE

James E. Polinski, Euclid, Ohio, assignor to Stevens Supply Company, Euclid, Ohio

Filed July 18, 1973, Ser. No. 380,214

Int. Cl. F24c *1/16, 3/00*

U.S. Cl. 126—25 B **9 Claims**



2. A heater device for heating charcoal bricks for a grill comprising,

a self-supporting base,

a hollow, open-ended stack mounted on said base for housing charcoal bricks therein,

said base includes an apertured grate supporting said charcoal bricks within said stack,

said grate comprises a stand which encloses a flat support plate, and a leg assembly depends from said support plate for supporting said support plate in elevated relation when said device is mounted on said grill,

said base is of a split construction including a pair of self supporting base portions,

said support plate being split diametrically forming a pair of plate sections having linear inner edges in the installed position thereof,

said leg assembly includes spaced leg members depending downwardly from said plate sections,

each of said leg members projects at one end beyond the periphery of its associated plate section,

said stack having one end seated on said legs being disposed outwardly and about said grate for directing air upwardly through said apertures and said stack to support combustion of said charcoal bricks, and

said base portions are detachably connected to one another adjacent said linear extending edges of said support plate to form a unitary, self supporting structure for supporting said stack thereon for quick removal therefrom.

3,903,867

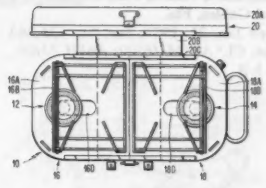
COOKING APPARATUS

Andres Vestergaard, Forest Hill Dr., Kingston, N.Y. 12401

Filed Jan. 15, 1974, Ser. No. 433,830

Int. Cl. F24c *5/20*

U.S. Cl. 126—38 **10 Claims**



10. A cooking apparatus comprising:

a support base;

a pair of burners each fixedly positioned with respect to said support base near an edge of the support base; and

a pair of extendable grill assemblies each associated with one of said pair of burners, each said pair of extendable grill assemblies being movable with respect to said fixedly positioned pair of burners and having at least two positions, in a first position being compactly collapsed in an area substantially defined by said support base, in a second position being extended beyond the area defined by said support base, substantially over its associated burner.

3,903,868

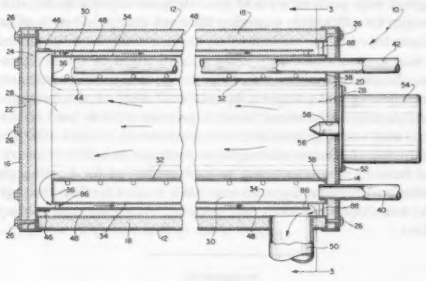
HOT WATER BOILER

Anthony Salvo, 1219 Main Rd, Tiverton, R.I. 02873

Filed Aug. 5, 1974, Ser. No. 495,128

Int. Cl.[2] **F24H** *1/00*

U.S. Cl. 126—361 **6 Claims**



1. A hot boiler comprising a cylindrical housing defined by an outer insulated cylindrical wall having a front cover closing off one end thereof and a rear cover closing off the other end, an inner combustion chamber located within said housing and extending axially and concentrically thereof, said chamber extending from said front cover and terminating short of said rear cover, an annular water jacket surrounding said chamber, a cylindrical restrictor plate extending from said rear cover and terminating short of said front cover, said restrictor plate being located between said water jacket and said outer wall and being spaced from each, said restrictor plate and said outer wall defining therebetween a dead-air insulation space, an exhaust stack extending through said outer wall and outwardly therefrom and located adjacent said front cover, inlet and outlet conduits communicating with said water jacket whereby water is continuously circulated therethrough, an opening in said front cover, and burner means located outside said front cover and firing through said opening, whereby the heated flue gases are forced rearwardly through said combustion chamber, and then forwardly between the outside of the

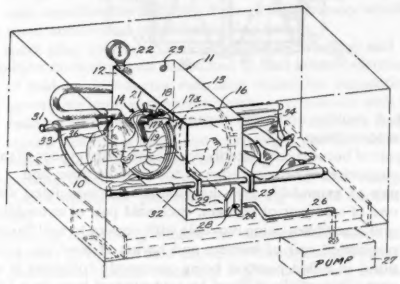
water jacket and the inside of the restrictor plate and then are exhausted out said stack.

3,903,869

CONTINUOUS NEGATIVE PRESSURE CHAMBER FOR INFANTS

Eduardo H. Bancalari, Miami, Fla., assignor to University of Miami, Coral Gables, Fla.

Filed Jan. 21, 1974, Ser. No. 435,263
Int. Cl.[2] A61M *16/00*; A61H *31/00*
U.S. Cl. 128—1 B 6 Claims



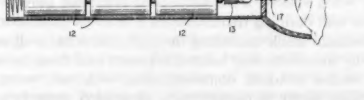
1. A continuous negative pressure chamber for treating infants having Idiopathic Respiratory Distress Syndrome comprising an enclosure having a top, a bottom, two spaced side walls and a front and a back spaced with respect to each other and made of a material which is visually transparent and also transparent to X-rays, said front and back being spaced from each other a distance of approximately 15 centimeters, which corresponds to the distance between an infant's neck and pelvic area, said front and back each having an opening aligned with each other and mounting an adjustable iris diaphragm for adjustably engaging the neck and pelvic area of an infant placed in the enclosure, a pressure manometer mounted to said enclosure for providing an indication of the air pressure therein, a pressure relief valve mounted to said enclosure for relieving the pressure in said enclosure if the pressure exceeds a predetermined limit, a vacuum inlet to said enclosure, and vacuum source means connected to said inlet for producing a continuous negative pressure in said enclosure, and heating means external to said enclosure for heating air within and surrounding said enclosure so that air flow through said iris diaphrams does not produce a deleterious cooling effect.

3,903,870

METHOD AND APPARATUS FOR OCULAR SELF-EXAMINATION

Wolf-Dieter Berndt, Neptune, N.J., assignor to Applied Optics Corporation, Neptune, N.J.

Filed Feb. 4, 1974, Ser. No. 439,067
Int. Cl.[2] A61B *3/00*
U.S. Cl. 128—2 T 2 Claims



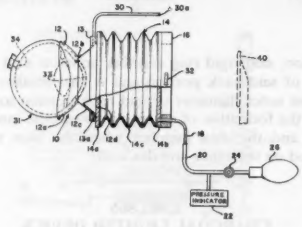
1. A method of detecting disease in the human eye comprising positioning an illuminated optical fiber of 10 mm diameter, or less, at the anterior focus of the eye, thereby to cause the eye to focus a parallel beam of light on the retina of the eye, the uniform retinal illumination caused by said point source permitting the user to see an image on his own retina.

3,903,871

OPHTHALMODYNAMOMETER

Gloria T. Chisum, Philadelphia, and John Nichparenko, Willow Grove, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 1, 1974, Ser. No. 465,800
Int. Cl.[2] A61B *3/00*, *5/02*
U.S. Cl. 128—2 T 12 Claims



1. An ophthalmodynamometer comprsiing:
a speculum member having an opening formed by two oppositely flaring surfaces of revolution, one of said surfaces being formed to fit against the sclera of the eye beneath the upper and lower eyelids;
a bladder member attached to the other of said surfaces for transmitting a force to said speculum member, said bladder member having a transparent portion concentric with said speculum opening;
first means attached to said bladder member for securing said one surface against the sclera;
second means operatively connected to said bladder member for varying the internal pressure of said bladder member; and
third means operatively connected to said bladder member for monitoring the internal pressure of said bladder member.

3,903,872

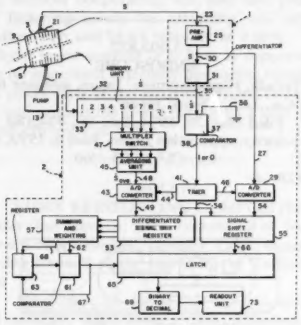
APPARATUS AND PROCESS FOR PRODUCING SPHYGMOMETRIC INFORMATION

William T. Link, Berkeley, Calif., assignor to American Optical Corporation, Southbridge, Mass.

Filed Feb. 25, 1974, Ser. No. 445,559
Int. Cl. A61b *5/02*
U.S. Cl. 128—2.05 A 26 Claims

1. In an apparatus for producing information indicative of the physical condition of a living test subject, said apparatus including means for applying a selectively changeable pressure to the test subject adjacent a blood vessel and means for measuring a fluctuating quantity proportional to a sum, said sum comprising a time-dependent fluctuating component representative of the pulsatile pressure within the blood vessel, plus the selectively changeable pressure applied externally adjacent the blood vessel, the improvement comprising:
means for converting said quantity into an electronic representation of a time derivative of at least the fluctuating component thereof;
means for analyzing changes in said electronic representation of said time derivative induced by changing the

applied pressure; and
means for producing an output from said analyzing means



indicative of the physical condition of the living test subject

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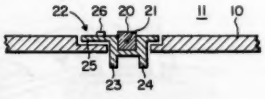
3,903,873
PULSE CONTOUR MEASURING INSTRUMENT
Douglas E. Royal, 1341 Via Cataluna, Palos Verdes Estates; Jess L. Sevy, 4939 Golden Arrow Dr., Palos Verdes Peninsula, and Gustave Solomon, 7215 Hillside Ave., No. 48, Los Angeles, all of Calif.
Filed May 13, 1974, Ser. No. 469,300
Int. Cl.[2] A61B *5/02*
U.S. Cl. 128—2.05 P **25 Claims**



1. A pulse contour measuring instrument for measuring the pulse of a mammal comprising:

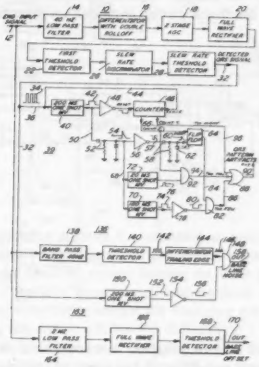
a. a balanced mechanical interferometer including a member having a first and a second support providing substantially equal resistance to motion, at least one of said supports being adapted to be placed on the flesh of the mammal for measuring its pulse, one of said supports having a point-like area adapted to be placed over an artery, whereby said interferometer responds essentially only to variations of the pulse pressure without responding to motions or tremors of the flesh;

b. means for supporting said member to detect the motion of said supports and including means for supporting said interferometer against the mammal;

c. transducer means coupled to said member for transforming the mechanical motion of said member into a single electric signal; and

d. an amplifier coupled to said transducer means for amplifying the electric signal substantially without amplifying electric noise.

3,903,874
CARDIOGRAPHIC SIGNAL PROCESSING MEANS AND METHOD
Charles B. Shakespeare, Phoenixville, Pa., assignor to Medi-science Technology Corporation, Cherry Hill, N.J.
Filed Aug. 27, 1973, Ser. No. 392,065
Int. Cl. A61b *5/04*
U.S. Cl. 128—2.06 A **33 Claims**

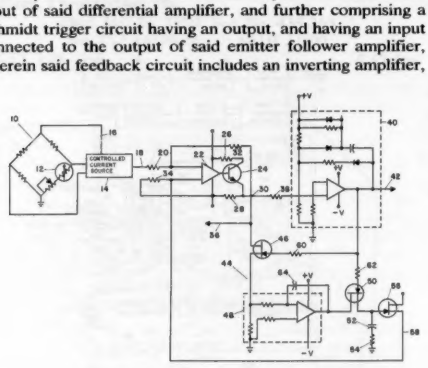


6. Cardiographic signal processing means comprising first means having an input for receiving a cardiographic information signal including QRS wave complex signals and delivering an output signal related to the differential of the input signal, second means receiving the output signal from said first means and delivering an output pulse signal for each input signal exceeding a predetermined amplitude providing one or more spaced pulse signals corresponding to each QRS wave complex signal of the received information signal, whereby an amplitude varying cardiographic input signal responsively produces an output signal with one or more related pulse signals for each QRS wave complex signal of said information signal, and third indicating means receiving the output pulse signals of said second means and delivering an output signal for each QRS wave complex signal of the received information signal responsive to the number and spacing of the received output pulses for each QRS wave complex signal and which output signal indicates whether the received information signal is not of pure cardiographic origin.

3,903,875
AUTOMATICALLY CALIBRATED RESPIRATORY VENTILATION MONITOR
Philip A. Hughes, Littleton, Colo., assignor to Sandoz Inc., E. Hanover, N.J.
Filed Jan. 24, 1974, Ser. No. 436,128
Int. Cl.[2] A61B *5/08*
U.S. Cl. 128—2.08 **2 Claims**

1. An improved respiration ventilation monitor comprising transducer means for generating an output signal in response to the exhalation of air by a patient during successive breathing cycles, wherein said transducer means comprises a resistance bridge circuit having a thermistor connected therein for mounting in a passage receiving air exhaled by the patient, controlled current source means having inputs coupled to the output of said bridge circuit, and having a first output coupled to said bridge circuit to balance the current applied to said thermistor, said controlled current source means including a second output for producing a signal proportional to said balancing current, amplifier means for producing an exhalation signal comprising a differential amplifier having first and

second inputs, wherein said second output of said controlled current source means is coupled to said first input of said differential amplifier, and wherein said amplifier means further comprises an emitter follower output amplifier connected to the output of said differential amplifier, means for automatically calibrating a zero level of said exhalation signal, said calibrating means including a feedback circuit coupled from the output of said emitter follower amplifier to the second input of said differential amplifier, and further comprising a Schmidt trigger circuit having an output, and having an input connected to the output of said emitter follower amplifier, wherein said feedback circuit includes an inverting amplifier,

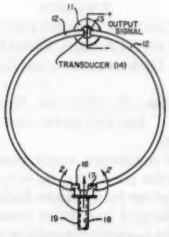


an input gate circuit coupled between said output of said emitter follower amplifier and an input of said inverting amplifier, sample and hold circuit means having an output coupled to said second input of said differential amplifier, an output gate circuit coupled between the output of said inverting amplifier and an input to said sample and hold circuit means, means connecting said input and output gates to the output of said Schmidt trigger circuit, wherein said input and output gate circuits are energized by said Schmidt trigger output to actuate said feedback circuit of said calibrating means during all portions of said breathing cycles except said exhalation portions.

3,903,876
RESPIRATION MONITOR

Thomas R. Harris, Tucson, Ariz., assignor to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Continuation-in-part of Ser. No. 287,435, Sept. 8, 1972, abandoned. This application Apr. 10, 1974, Ser. No. 459,780
Int. Cl.[2] A61B *5/08*
U.S. Cl. 128—2.08 **4 Claims**

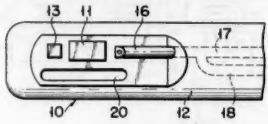


1. A respiration monitor for remotely sensing flow of inspired and expired air along a respiratory air flow path comprising, a plurality of tubes having open ends, means connected to one end of each of said tubes for holding each of said one ends adjacent the respiratory air flow path so that inspired and expired air flows across said one end of each of said tubes to induce air flow into said tubes from their other ends, means vented to the atmosphere attached to said other ends of each of said plurality of tubes, a transducer mounted within said means vented to the atmosphere adjacent to said other ends and providing an output signal responsive to temperature change induced by cooling air flow, whereby the flow of air into said tubes from the atmosphere causes said transducer to produce said output signal, said output signal thereby being indicative of respiratory air flow relative to a critical threshold.

3,903,877
ENDOSCOPE

Masaaki Terada, Higashiyamato, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed May 29, 1974, Ser. No. 474,180
Claims priority, application Japan, June 6, 1973, 48-66765
Int. Cl.[2] A61B *1/06*
U.S. Cl. 128—6 **6 Claims**

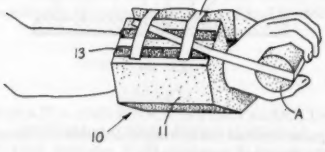


1. An endoscope comprising a distal end; a view window formed at the distal end; a nozzle disposed at the distal end with the opening of said nozzle directed to the view window; and two separately provided feed lines one for washing liquid and the other for air, respectively connected to the nozzle through a common passage communicating with each said feed line adjacent the nozzle.

3,903,878
DEVICE FOR SUPPORTING A LIMB AND ASSOCIATED EXTREMITY

Donald C. Spann, 5 Ferncreek Ct., Greenville, S.C.

Filed Nov. 4, 1974, Ser. No. 520,372
Int. Cl.[2] A61F *5/10*
U.S. Cl. 128—77 **6 Claims**



1. A device for supporting a lower portion of a limb and an associated extremity avoiding the sagging of related muscles as often results from inactivity due to prolonged bed rest and the like, comprising:

a. a supporting block member constructed from resilient deformable polyurethane foam material;

b. a continuous internal groove portion extending longitudinally through the entire length of said block providing a cradle for a lower portion of a limb;

c. said block member having a thickened base portion for supporting the lower portion of a limb and the associated extremity above a surface of a bed;

d. said block member including a slot extending radially from said groove portion through an outer wall surface providing an opening in said block for receiving the lower portion of a limb therethrough;

e. first pressure sensitive fastening means carried by said member on said outer wall surface adjacent opposite sides of said slot for gripping the lower portion of a limb therein;

f. an elongated strip member constructed from resilient polyurethane foam material for engaging the underside of the associated extremity of a limb; and

g. second pressure sensitive fastening means carried by said strip member cooperating with said first pressure sensitive fastening means for attaching said strip member together with said block member as a unit;

whereby a lower portion of a limb is supported together with its associated extremity depending upon the adjustable positioning of the fastening means to securely position and support the lower portion of a limb and its associated extremity as a unit.

3,903,879
FIBRE REINFORCING COMPOSITES

Victor Riley; Ian Macnab; John Timusk, all of Toronto, Canada, and Edward English, Downey, Calif., assignors to The Governing Council of the University of Toronto, Toronto, Canada

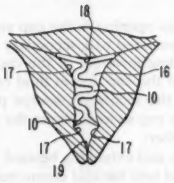
Filed Mar. 22, 1973, Ser. No. 343,863
Claims priority, application United Kingdom, Mar. 22, 1972, 13333/72
Int. Cl.² A61L *15/07*
U.S. Cl. 128—91 R **2 Claims**

1. A medical plaster cast comprising gypsum reinforced with a woven bandage of absorbent cotton or rayon fibres constituting the longitudinal thread of said bandage, and reinforcing fibres of glass yarn coated with polyvinyl chloride, or polyethylene constituting the transverse fibres of said bandages. constituting the transverse fibres of said bandages.

3,903,880
INTRAUTERINE DEVICE FOR MANAGING THE REPRODUCTIVE PROCESS

Takeru Higuchi, and Anwar Hussain, both of Lawrence, Kans., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 80,531, Oct. 14, 1970, abandoned. This application Aug. 17, 1972, Ser. No. 281,446
Int. Cl. A61f *5/46;* **A61m** *31/00*
U.S. Cl. 128—130 **10 Claims**

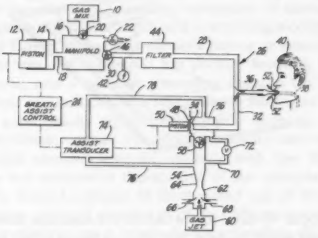


1. In an intrauterine device for controlling fertility comprising a body of polymeric material containing a progestational steroid capable of diffusing through said polymeric material at a fertility controlling rate, said body being adapted for insertion and retention in the uterine lumen, the improvement wherein said intrauterine polymeric body is comprised of uterine acceptable ethylene-vinyl acetate copolymer having a vinyl acetate content of about 4 to 80% by weight, a melt index of 0.1 to 1,000 grams per ten minutes and permeable to the progestational steroid with the steroid dissolving in and passing through the ethylene-vinyl acetate copolymer by diffusion.

3,903,881
RESPIRATOR SYSTEM AND METHOD

James Weigl, Rialto, Calif., assignor to Bourns, Inc., Riverside, Calif.

Filed Apr. 12, 1974, Ser. No. 460,621
Int. Cl.² A61M *16/00*
U.S. Cl. 128—145.6 **15 Claims**



1. A respirator system for assisting a patient's breathing during alternate inhalation and expiration phases, said system including gas conduit means having an inlet port, an outlet port, and a patient supply tap intermediate said inlet and outlet ports, recyclable means for charging gas into said inlet port during inhalation phases for delivery to a patient, a control means for actuating said charging means, first valve means adapted to block an outward flow of gas through said inlet port during expiration phases, and second valve means adapted to block an inward flow of gas through said outlet port during inhalation phases, wherein the improvement comprises the provision of:

a pressure plenum,

means for positively maintaining said plenum at a predetermined pressure level,

bleeder means adapted to conduct gas from said plenum into said gas conduit means, and

a gas flow sensing means adapted to sense a flow of gas through said conduit means towards the patient during expiration phases and to produce a control signal in response to said flow exceeding a predetermined threshold flow rate,

said control means being connected to said sensing means for actuation by said control signal, and said bleeder means providing a gas flow path of sufficient conductance to enable a substantially unrestricted inflow of gas into said conduit means from said plenum at a maximum rate approximately equal to said threshold flow rate, whereby gas leaks from the patient supply tap at leak rates not exceeding the said threshold flow rate are replenished by a compensating gas flow into the conduit means from the pressure plenum without producing a control signal for actuating the gas charging means, and the pressure in said conduit means is maintained at a level substantially at least equal to said predetermined plenum level despite said gas leaks.

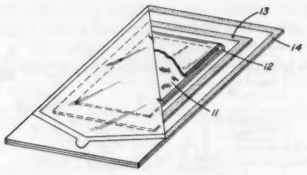
3,903,882
COMPOSITE DRESSING

Thomas Anthony Augurt, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 19, 1974, Ser. No. 462,490
Int. Cl.² A61F *13/00*
U.S. Cl. 128—155 **8 Claims**

1. A wound dressing for the surface of living tissue from which at least part of the skin has been removed and which tissue is subject to moisture loss, and bacterial contamination, which dressing is sufficiently flexible that it will conform and adapt to the surface of the tissue to minimize pools of fluid or air between the dressing and the tissue surface, which pools generate problems of infection, and which has a permeability

to moisture of the order of that of the intact human skin (approximately 2.2 mg/sq. cm./hr.), which comprises: an elastomeric layer of the order of 0.1 to 5 mils thick, and which elastomeric layer has bonded thereto a fabric knitted of continuous fibers of the order of ½ to 12 denier of a tissue compatible material which is substantially absorbed by living tissue



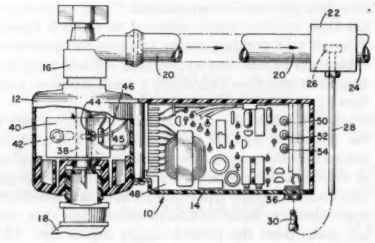
within about 90 days, and which fibers maintain their integrity for at least about 10 days, and which knitted fabric has a tissue contacting surface free from upstanding loops, and which has interstitial spaces into which granulating tissue can grow, but which readily releases granulating tissue 4 to 10 days after emplacement.

3,903,883

VARIABLE AEROSOL HEATER WITH AUTOMATIC TEMPERATURE CONTROL

Richard W. Pecina, Waukegan, and Robert J. Froehlich, Rosemont, both of Ill., assignors to Respiratory Care, Inc., Arlington Heights, Ill.

Filed Apr. 17, 1974, Ser. No. 461,753
Int. Cl.[2] A61M *15/00*
U.S. Cl. 128—193 **5 Claims**



1. In combination with an inhalation therapy device of the type wherein a column of water is drawn from a receptacle through an electric heating unit, whereby the water is heated, and into an atomizing device, whereby the heated water is atomized, and wherein the heated water is combined with a flow of oxygen to provide a stream of humidified oxygen and wherein said stream of humidified oxygen is delivered through an extended hose to the site of a patient, and wherein the stream of humidified oxygen is thereat administered to said patient, the improvement which comprises:

means for sensing the temperature of the stream of humidified oxygen at the said patient site immediately prior to its administration to the said patient and for generating an electrical signal representative of said temperature; and, control means responsive to said signal for controlling the amount of heat generated by said electric heating unit to maintain the stream at a preselected temperature;

wherein said control means comprises:

gate controlled bilateral switch means for controlling the flow of electric current through said electric heating unit;

means for amplifying said electrical signal; and,

means connected to the gate electrode of said bilateral switch means for controlling the conductive state of said swtich means in response to said amplified electrical signal;

means for sensing the temperature of said electric heating unit and generating an output signal indicative thereof; and,

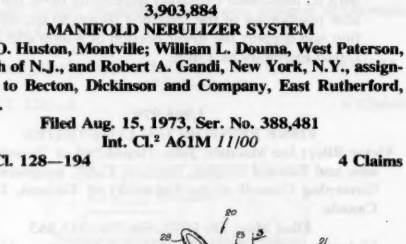
means for overriding said amplified electrical signal and causing said bilateral switch means to be in its non-conductive state when said output signal indicates a preselected maximum temperature.

3,903,884

MANIFOLD NEBULIZER SYSTEM

Paul O. Huston, Montville; William L. Douma, West Paterson, both of N.J., and Robert A. Gandi, New York, N.Y., assignors to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Aug. 15, 1973, Ser. No. 388,481
Int. Cl.[2] A61M *11/00*
U.S. Cl. 128—194 **4 Claims**



1. A manifold nebulizer system for use in a breathing circuit comprising:

a nebulizer module including a cap portion having a chamber therein and a through passageway thereacross;

means on the cap portion forming at least one side of said through passageway for removable connection to a main source of gas to facilitate passage of gas through the cap portion;

the cap having a depending skirt with means thereon for receiving in sealed relationship a vial designed to contain liquid;

means forming an opening in the cap and for the cap to be removably connected to a secondary source of gas;

a nozzle depending inwardly of the cap in alignment with the opening in the cap and in fluid communication with the gas from the secondary source passing through the opening in the cap so as to direct the gas at high velocity into the chamber;

a tube in the cap and extending beyond the depending skirt so as to extend into the vial connected with the cap with one open end adjacent to and in fluid communication with the nozzle and the other open end in liquid contained in the vial so that when secondary gas passes from the nozzle it will entrain liquid from the tube and atomize said liquid into the gas stream baffle means in the cap to assist in removing large liquid particles in the chamber and to direct a portion of the primary flow of gas into the cap into communication with the aerosol to provide a homogenized mixture into the main gas flow passageway for discharge from the nebulizer module;

an exhaust module having a body portion with a through passageway and being removably connectable to the nebulizer module;

an exhaust valve assembly on the body portion including an exhaust opening;

means for removably coupling the part of the exhaust module containing one end opening of the through passageway therein to a patient connection;

adjustable surfaces on the manifold nebulizer to permit relative movement between the modules thereof to thereby facilitate use of the nebulizer in a breathing circuit whereby when the nebulizer is connected to a primary gas source and a patient connection and a patient inhales an aerosol of liquid particles will be inhaled, and when the patient exhales, the valve assembly will open permitting the expired vapors to pass through the exhaust opening and out of the circuit;

the cap portion having a lateral tubular extension extending therefrom and the exhaust module having a lateral receiving tubular portion extending therefrom;

the lateral projection from the cap portion including means to sealingly removably engage with the lateral extension of the exhaust module and to achieve communication between the passageways through the nebulizer module and the exhaust module;

a post being mounted on one of said lateral projecting portions and extending substantially perpendicular therefrom so that when the modules are interengaged and the post is mounted thereon, the post will provide mounting surfaces for the nebulizer; and

the post containing a series of spaced recesses and the corresponding portion of the module on which the post is to be mounted contains a plurality of spaced corresponding projections and the post rotatably mountable about the corresponding portion of the module so that when the post is mounted with the projections in the corresponding recesses, rotation of the post with respect to at least one of the modules will permit mounting of at least one module in any desired rotation.

3,903,885

DEVICE FOR INTRODUCING FLEXIBLE CATHETERS

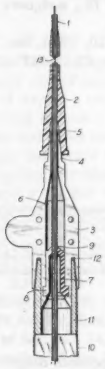
Heinz Fuchs, Melsungen, Germany, assignor to B. Braun Melsungen Aktiengesellschaft, Melsungen, Germany

Filed Jan. 25, 1974, Ser. No. 436,798

Claims priority, application Germany, Feb. 6, 1973, 2305640

Int. Cl. A61m *05/00*

U.S. Cl. 128—214.4 **2 Claims**



1. A catheter placement unit comprising a plastic cannula adapted to be placed in a blood vessel having an attachment end portion including a generally conically shaped recess formed therein; a divisible catheter guide piece having a longitudinal bore formed therein and first and second end portions; said first end portion being conically shaped for frictional engagement in the conical recess of said cannula; said second end portion of said guide piece having a groove formed therein and a collet mounted in said groove in frictional engagement with said guide piece whereby said collet and the frictional engagement of said first end portion in said conical recess hold the guide piece together; a generally cylindrically shaped elastic element mounted in the bore of said guide piece; said element and guide piece bore having cooperating means for preventing longitudinal movement of said element in said bore, said cooperating means comprising a cooperating recess and flange; said elastic element having an internal bore formed therein and a tapered top portion tapering towards said cannula; and a catheter extending through the bore in said element and said cannula; said catheter having an outside diameter substantially equal to the inside diameter of said bore in the elastic element whereby the catheter can be moved through said element into the cannula with low frictional resistance but movement thereof out of the cannula will be resisted by inward collapse of the tapered top of the elastic element upon outward movement of the catheter and wherein said elastic element has a longitudinally extending slit formed therein to permit removal thereof from said catheter after placement of the catheter.

3,903,886

GLASS LINED INJECTOR

Kazuo Omotani, 7-27-Higashi 2-Chome, Hiroshima, Japan

Filed July 12, 1973, Ser. No. 378,672

Claims priority, application Japan, July 12, 1972, 47-69154; Oct. 2, 1972, 47-113420

Int. Cl.[2] A61M *5/28;* **A61J** *1/06*

U.S. Cl. 128—218 DA **5 Claims**

1. A double layer cylindrical injection syringe comprising: a continuous outer tubular body of synthetic resin free from openings along the length thereof and having at one end an integral needle securing hollow hub sealed fully across the entire inner end by a thin rupturable film; an injection needle on said hub; and at the other end of said body a radially projecting gripping flange and an opening sealed by axially displaceable plug means, the entire length of said body being integrally lined along the interior wall by a tightly fitted thin glass tube open at at least one end and positioned between said body and said plug means.

3,903,887

NEEDLE

William T. Antoshkiw, Kearny, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

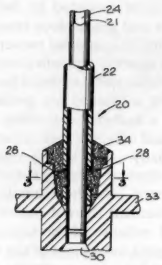
Filed June 24, 1974, Ser. No. 482,746

Int. Cl.[2] A61M *05/32, 25/00*

U.S. Cl. 128—221 **11 Claims**

1. A needle comprising; an inner cannula open at both ends and having a passageway therethrough, a tubular sheath disposed in surrounding engagement with a substantial portion of the outer surface of the cannula and having at least one side opening therein so as to expose the inner cannula therethrough, a hub having a passageway therethrough and having a cavity in the forward end portion thereof and positioned over one end portion of the cannula and the portion of the

sheath containing the side opening in spaced relationship therewith and being bonded to the cannula through the side



opening by bonding material located in the cavity and in direct bonding contact with the cannula and the hub so as to hold the cannula and sheath in fixed position with respect to the hub.

3,903,888

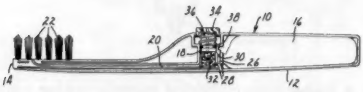
TIME-DELAY METERING DISPENSER

Joseph S. Buelow, Maplewood, and Thomas S. Reid, Little Canada, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 11, 1974, Ser. No. 450,008

Int. Cl.[2] A61J *7/00;* **B43K** *5/18;* **B67D** *3/00*

U.S. Cl. 128—222 **21 Claims**



1. A device suitable for dispensing medicinal fluids in repeated measured dosage amounts with predetermined minimum time delay between consecutive doses comprising:

an applicator head embodying a medicament spreading means;

a handle means attached to said head;

a first reservoir containing a quantity of medicament fluid constituting a plurality of single doses contained within said handle means;

a second reservoir for containing and storing a single dose amount of said fluid medicament within said handle means;

dispensing means adapted to deliver the medicament fluid contained in said second reservoir to said medicament spreading means; and time-delayed filling means connecting said first reservoir and said second reservoir, said means being adapted to positively refill said second reservoir over a predetermined period of time not less than about 30 minutes;

whereby after each dose of medicament of predetermined amount has been delivered to the applicator head for application of said medicament to a desired area for treatment said device will dispense a following dose of medicament only after said predetermined period of time.

3,903,889

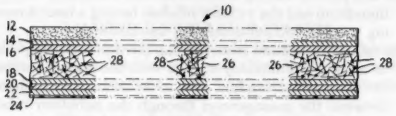
DISPOSABLE LIQUID ABSORBENT PRODUCTS

David Torr, deceased, late of Las Vegas, Nev., assignor to First National Bank of Nevada, Executor of the Estate of David Torr, Las Vegas, Nev.

Filed Feb. 16, 1973, Ser. No. 342,162

Int. Cl. A61f *13/16*

U.S. Cl. 128—287 **11 Claims**



1. In a multi-layer, disposable absorbent product such as a disposable diaper, sanitary napkin, or the like,

a liquid-pervious body contacting layer,

an outer material layer, said outer material layer being characterized by being liquid-impervious, and

a dry liquid-absorbent organic material disposed between said body-contacting and outer layers in substantially fixed relationship therewith,

there also being a core of at least one layer of a bulking material disposed between said body-contacting and outer layers, there being a film of a water-repellent adhesive agent overlaying said bulking material layer at the side thereof remote from said outer layer, said absorbent organic material being overlayingly adhered to said film, there being a second liquid-pervious film of said adhesive agent overlaying said absorbent organic material.

3,903,890

DISPOSABLE DIAPER OF SIMPLE CONSTRUCTION

Frederick K. Mesek, Downers Grove, and Virginia L. Repke, Oak Forest, both of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Aug. 20, 1974, Ser. No. 498,892

Int. Cl.[2] A61F *13/16*

U.S. Cl. 128—287 **14 Claims**

1. A multi-layer disposable diaper comprising (1) a highly porous batt comprised at least primarily of short cellulosic fibers and (2) a water-impervious backing sheet adjacent one surface of said batt and bonded thereto in spaced areas of adhesion, the fibers of said batt being bonded together by a resinous binder covering the surface opposite said backing sheet to provide a smooth permable skin as a body contacting surface of said batt, said resinous binder extending throughout the thickness of said batt in spaced linear areas.

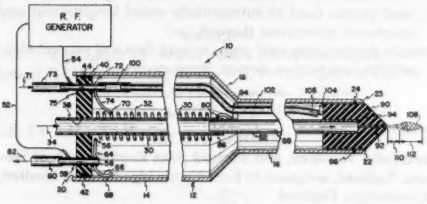
3,903,891
METHOD AND APPARATUS FOR GENERATING PLASMA

Forrest G. Brayshaw, Salt Lake City, Utah, assignor to Hogle-Kearns International, Salt Lake City, Utah

Continuation-in-part of Ser. No. 704,500, Jan. 12, 1968, abandoned, which is a continuation-in-part of Ser. No. 651,224, July 5, 1967, abandoned. This application Oct. 12, 1970, Ser. No. 79,840

Int. Cl.² A61B *17/32; A61N 3/00*

U.S. Cl. 128—303.14 **15 Claims**



1. A method for performing surgery which comprises:
establishing and maintaining a cold plasma of a sufficiently small cross section to permit a narrow region of contact between the plasma and tissue; and
applying said plasma to tissue to produce an incision.

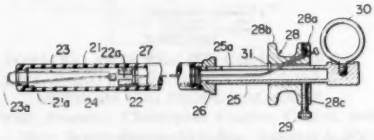
3,903,892
FORCEPS MEANS FOR REMOVING CELLULAR TISSUE FROM THE BODY CAVITIES

Osamu Komiya, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed May 17, 1973, Ser. No. 361,152

Int. Cl.² A61B *17/36*

U.S. Cl. 128—303.15 **2 Claims**



1. A surgical instrument comprising a tube with a stepped portion in the inside at one end of said tube, a slider slidably arranged in said tube and having a center hole, a wire made of a resilient material having at least a bent portion, one end of said wire being fixed to said slider and the other end of said wire being passed through the center hole of said slider and being fixed to an operating ring provided at an end of said tube opposite said one end, and a stopper with an outer diameter larger than the diameter of the center hole of said slider attached to said wire.

3,903,893
NASAL HEMOSTATIC DEVICE

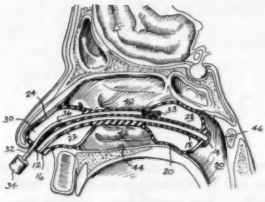
Alexander L. Scheer, 1529 Ash Dr. East, Elkhart, Ind. 46514

Continuation-in-part of Ser. No. 34,330, May 4, 1970, abandoned, and a continuation of Ser. No. 183,579, Sept. 24, 1971, abandoned. This application Oct. 16, 1973, Ser. No. 406,844

Int. Cl.² A61B *17/12*

U.S. Cl. 128—325 **6 Claims**

1. A nasal hemostatic device comprising a flexible tube having a breathing passage therethrough and including proximal and distal ends, said tube adapted for insertion through the vestibulum and into the nasal passage, said tube including first inner and outer annular wall parts adjacent its said distal end and second inner and outer annular wall parts adjacent its said proximal end, said first inner and outer wall parts being spaced from said second inner and outer wall parts, said first outer wall part being expandable and defining in conjunction with said first inner wall part a first chamber, said second outer wall part being expandable and defininin in conjunction with said second inner wall part a second chamber, conduit means communicating with said first and second chambers and adapted to connect to a fluid source, said conduit means for introducing fluid simultaneously and at controlled rates into said first and second chambers to cause the expansion of said first and second wall parts, and a removable sleeve means encircling said tube at one of said first and second outer wall parts for preventing the expansion of said one outer wall part against the nasal passage when said device is located in said nasal passage.



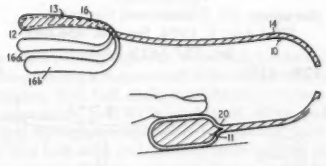
3,903,894
IMPLANTABLE CLAMP

Isaac Michael Rosen, 3 Northwood Rd., Mt. Ousley, New South Wales, Australia (2519); Owen James Tassicker, 119 Heaslip St., Mangerton, New South Wales, Australia (2500), and David John Angus, 151 Northcliff Dr., Lake Heights, New South Wales, Australia (2502)

Filed July 26, 1974, Ser. No. 492,328

Int. Cl.² A61B *19/00*

U.S. Cl. 128—346 **4 Claims**



1. An implantable prosthetic device comprising a compressible fluid reservoir, jaw means transportable between an "open" and a "closed" condition, the jaw means being biased towards one of these conditions, and a fluid expandable actuating member connected to the reservoir by a fluid duct, the actuating member being adapted to transpose the jaw means to the other of said conditions upon being expanded by the compression of the fluid reservoir, said jaw means comprising three spaced apart parallel arms, the arms being connected together by a bight portion and being so disposed as to be, when viewed in cross-section, at the apices of a notational equilateral triangle.

3,903,895
CARDIOVASCULAR CATHETER

Ralph D. Alley, Loudonville, and David S. Sheridan, Argyle, both of N.Y., assignors to Sherwood Medical Industries, Inc., St. Louis, Mo.

Continuation of Ser. No. 321,673, Jan. 5, 1973, abandoned, which is a division of Ser. No. 138,770, April 29, 1971, Pat. No. 3,788,328, which is a continuation of Ser. No. 843,863, May 3, 1969, abandoned. This application May 1, 1974, Ser. No. 465,926

Int. Cl.[2] A61M *27/00*

U.S. Cl. 128—350 R **3 Claims**

1. A catheter suitable for use during surgery and having a distal end portion and a proximal end portion having a larger diameter than said distal end portion and being joined by an intermediate integrally formed partially tapered body portion, said distal portion having an end opening and at least one side opening communicating with the inside of said catheter, said proximal portion being adapted to be connected to an externally operative device, a non-inflatable ring fixedly secured on the outer surface of the distal end of the catheter but proximal to the side opening, said ring tapering from a distal end of said ring to an enlarged diameter portion and having a proximal wall portion lying substantially perpendicular to said catheter, said ring being adapted to penetrate the incision together with the tip and distal end of the catheter, and a second ring slidably mounted on the catheter proximal to said first ring and having a distal wall portion lying substantially perpendicular to said catheter, said second ring being in snug forced slip fit with the catheter outer surface permitting it to be moved with moderate force axially along the catheter.

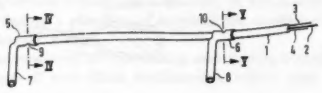
3,903,896
CATHETER FOR THE ELECTRICAL STIMULATION OF THE HEART

Dietrich Harmjanz, 17, 3 Hannover, Germany

Filed Apr. 1, 1974, Ser. No. 456,645

Int. Cl.[2] A61N *1/04*

U.S. Cl. 128—418 **6 Claims**



1. In a catheter for electrical stimulation of the heart of the type including a plastic cord of substantially circular cross-section, a first and second conductor within said plastic cord, said first and second conductors being substantially diametrically opposed, a pair of electrodes at one end of said plastic cord, and a pair of plugs near the end opposite said electrodes, an improved means for connecting said plugs and said first and second conductors, respectively, comprising, in combination: a first and second contact area along said plastic cord, said first and second contact areas being substantially diametrically opposed and exposing a portion of said first and second conductors, respectively, said portion of said first and second conductors having a predetermined length;

a first and second electrically conductive sleeve engagingly receiving said plastic cord, said first and second sleeves having a sleeve length greater than said predetermined length and a crimped portion substantially longitudinally and radially aligned with said first and second contact areas, respectively, said crimped portion of said first and second electrically conductive sleeves contacting said exposed portion of said first and second conductor, respectively, said crimped portion and said sleeve length cooperatively defining means for securing said sleeve to said plastic cord to substantially avoid longitudinal and rotational movement thereof; and

means for securing said plugs to said first and second electrically conductive sleeves, respectively.

3,903,897
CARDIAC PACER

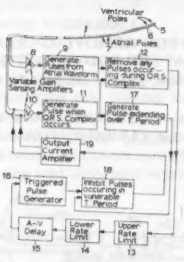
David John Woollons, and Michael John English, both of Sussex, England, assignors to Kent Cambridge Medical Limited, Cambridge, England

Filed Mar. 9, 1973, Ser. No. 339,537

Claims priority, application United Kingdom, Mar. 11, 1972, 11501/72

Int. Cl. A61n *1/36*

U.S. Cl. 128—419 PG **15 Claims**



1. A synchronous cardiac pacer comprising:

atrial electrode means which is adapted so that it can be arranged in relation to an atrium of a heart in order to sense the naturally occurring P-wave of said heart and produce a corresponding sensed P-wave signal;

ventricular electrode means which is adapted so that it can be arranged in relation to a ventricle of said heart in order to sense the naturally occurring QRS complex of said heart and produce a corresponding sensed QRS signal;

gating means which has an output connection to said ventricular electrode means and respective input connections from said atrial electrode means and ventricular electrode means so as to receive said P-wave and QRS signals without disturbing the phase relationship between them, and which responds to said P-wave and QRS signals by blocking any similar signal variations which occur simultaneously so that only a pure P-wave signal without any QRS complex component passes to the output connection;

pulse generating means which is connected in the P-wave channel comprising said atrial electrode means, said gating means, said output connection and said ventricular electrode means to produce a pulse signal corresponding to said P-wave signal, whereby a pure P-wave pulse signal is applied to said ventricular electrode means as a stimulating signal for said heart; and

delay means which is connected in said P-wave channel and introduces an appropriate atrio-ventricular delay in said P-wave signal.

3,903,898

TOBACCO SMOKE FILTER

Wayne L. Ryan, Omaha, Nebr., assignor to Phillipe Shubik, Omaha, Nebr., a part interest

Filed May 21, 1974, Ser. No. 472,051
Int. Cl.[2] A24B *15/02*
U.S. Cl. 131—10.9 20 Claims

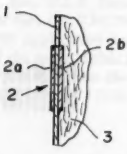
1. A tobacco smoke filter body containing dispersed therethrough a small amount of antibody to a carcinogen found in tobacco smoke, said amount being effective to remove at least substantial quantities of said carcinogen from said tobacco smoke as it passes through said filter.

3,903,899

CIGARETTE WRAPPER CONSTRUCTION

Robert G. Musillo, 5481 Wolfe Dr., Pittsburgh, Pa. 15236

Filed Sept. 13, 1973, Ser. No. 397,146
Int. Cl.[2] A24D *1/02*; D21H *5/16*
U.S. Cl. 131—15 R 2 Claims



1. A cigarette having a combustible paper wrapper and a plurality of substantially uniformly distributed, separate, non-combustible spots throughout said paper wrapper, said spots formed by outer and inner thin layers of non-combustible aluminum foil opposite each other on said wrapper, to prevent burning of the paper wrapper material in said spots so as to prevent inhalation of the products of combustion of said paper wrapper material otherwise generated in said spots.

3,903,900

TOBACCO ARTICLES AND COMPOSITIONS CONTAINING 1,2-CYCLOHEXANEDIONE AND METHODS FOR PRODUCING SAME

John Wolt, Freehold; Christopher Giacino, Califon, both of N.J.; Alton Dewitt Quinn, Calicoon; Edward J. Shuster, Brooklyn, both of N.Y., and Joaquin F. Vinals, Red Bank, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 359,679, May 14, 1973, Pat. No. 3,875,307. This application Oct. 15, 1974, Ser. No. 515,066
Int. Cl.[2] A24B *15/04*
U.S. Cl. 131—17 R 9 Claims

1. A process for altering the organoleptic properties of tobacco which comprises adding thereto a small but effective amount of 1,2-cyclohexanedione.

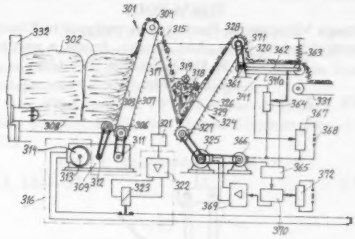
3,903,901

METHOD AND APPARATUS FOR MANIPULATING TOBACCO

Waldemar Wochnowski, Hamburg-Volksdorf, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

Filed Aug. 1, 1969, Ser. No. 846,697
Claims priority, application Germany, Mar. 21, 1969, 1714466; Apr. 21, 1969, 1782380
Int. Cl. A24b *07/14*
U.S. Cl. 131—21 R 9 Claims

1. A method of converting compacted tobacco into a continuous stream, comprising the steps of breaking up a bale of compacted tobacco by removing tobacco from said bale at a first station to form loose tobacco; conveying loose tobacco from the first station along a predetermined path, including transporting loose tobacco from said first station to a second station which is adjacent to said path, collecting the thus transported tobacco at said second station to form a determinate supply of loose tobacco and evacuating a stream of loose tobacco from said supply; measuring the quantity of tobacco at said second station, including measuring the quantity of



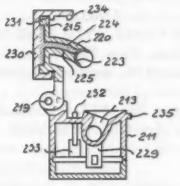
tobacco in said supply; regulating the rate of removal of tobacco at said first station as a function of the result of measurement at said second station; measuring the quantity of tobacco per unit length of said stream at a third station downstream of said second station; and regulating the evacuation of tobacco from said supply as a function of the measurement at said third station.

3,903,902

DEVICE FOR FILLING CIGARETTE TUBES

Rudolf Messner, Trossingen, and Hans-Joachim Zilken, Stuttgart, both of Germany, assignors to Martin Brinkmann AG, Bremen, Germany

Division of Ser. No. 212,941, Dec. 28, 1971, Pat. No. 3,783,882. This application Nov. 5, 1973, Ser. No. 413,042
Claims priority, application Germany, Dec. 31, 1970, 2064641; Aug. 19, 1971, 2141471
Int. Cl. A24c *5/42*
U.S. Cl. 131—70 5 Claims



1. A device for filling cigarette tubes with tobacco comprising a housing having a bottom wall in the shape of a longitudinally extending first half shell, a lid having a lower portion forming a press-bar, said lid being hinged at one end to said housing and forming a longitudinal second half shell aligned with said first half shell and defining therewith on closing of said lid, a chamber having a longitudinal axis for forming a plug of tobacco, said lid having an upper portion forming an ejector slidable with respect to said lower portion along the axis of said chamber, and means for holding a paper tube at the end of said chamber comprising a cylindrical socket for receiving the paper tube, a pivotal lever having a front end opposite said socket and extending below said chamber from said socket rearwardly to the opposite end of said housing, spring means for biasing the front end of said lever away from said socket, and a cam fixed to the lid at its hinged end adapted to engage said lever on closing of said lid to cause said front end to move toward said socket to hold said paper tube thereon, a spoon slidably located within said second half shell, said spoon having an end for engaging the end of said plug and

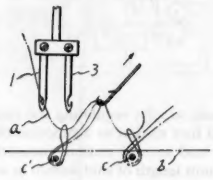
a longitudinal curved slide conforming to said second half shell, and means connecting said spoon to said upper portion of said lid for moving said slide and spoon end longitudinally in said chamber to eject said plug into said socket.

3,903,903

METHOD AND EQUIPMENT FOR PLANTING HAIRS IN SHEET-FORM NET-LIKE MATERIAL OR THREAD FORM BODY

Yoshitsugu Matsumura, Nara, Japan, assignor to Kanegafuchi Chemical Industry Co., Ltd., Osaka, Japan, a part interest

Filed Apr. 9, 1973, Ser. No. 349,128
Int. Cl. A41g *3/00*
U.S. Cl. 132—5 **4 Claims**



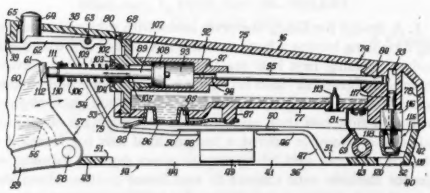
1. A method for planting thread-like materials in a base material continuously and mechanically by means of a sewing device, comprising the steps of: passing a first looped portion of a thread-like material through the base material from a front to a back surface thereof; subsequently passing the first looped portion, at a point spaced slightly apart from the point at which it first passed through the base material, through the base material from the back surface to the front surface thereof; folding other portions of said thread-like material to form another looped portion at a place where one of said other portions of said thread-like material has a free end; pulling said another looped portion to pass it through the first looped portion so that the folded double thread-like material portions formed by said another looped portion are tied firmly with said first looped portion and with the base material.

3,903,904

HEATED COMB WITH MIST FEATURE

William R. Hemrich, Glen Ellyn, and George P. Gallanis, Westchester, both of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Jan. 16, 1973, Ser. No. 324,022
Int. Cl.[2] A45D *20/00*
U.S. Cl. 132—9 **5 Claims**



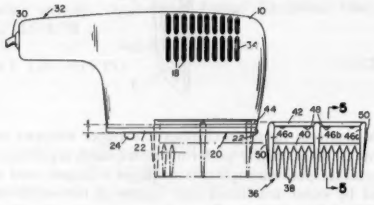
1. A heated comb with mist feature comprising an elongated housing portion having air inlet means provided at the rear end thereof and air outlet means provided on the underside thereof toward the forward end thereof, means for releasably attaching a comb to said housing portion adjacent said air outlet means with the comb teeth depending therefrom, a motor actuated fan disposed in said housing portion adjacent said air inlet means, heater means disposed in said housing portion between said fan and said air outlet means, a second body portion removably mounted on the forward end of said elongated body portion above said air outlet means, said second body portion defining a fluid reservoir and having a pump and spray nozzle mounted therein with said spray nozzle being disposed adjacent one end of said air outlet means, being directed in the same direction as said comb teeth and being in communication with an outlet of said pump, and a lever pivotably mounted on said elongated housing portion for actuating said pump.

3,903,905

HAIR DRYING AND STYLING APPARATUS

James Edgar Tucker, Chicago, Ill., assignor to The Gillette Company, Boston, Mass.

Continuation of Ser. No. 258,648, June 1, 1972, abandoned. This application Oct. 9, 1973, Ser. No. 404,193
Int. Cl.[2] A45D *20/00*
U.S. Cl. 132—9 **8 Claims**



1. Portable hair styling apparatus, comprising
a plurality of hair styling tools, and
a pair of tool supports,
said tools and said supports having respective complementary portions engageable for interchangeably detachably mounting said tools on either of said supports, one of said supports comprising a dryer housing defining an air inlet and a single air outlet and including therein blower means disposed within the housing for drawing a stream of air into the air inlet, through the dryer housing, and forcing it out of the air outlet, said complementary portions of said one of said supports being arranged on said housing for engaging said complementary portions of said tools to support said respective tools at least partially within the air stream from said outlet,
the other of said supports being a handle having hand-grip and mounting portions extending in opposite directions along an axis, said complementary portions of said other of said supports being arranged on said mount portion for engaging said complementary portions of said tools to support said respective tools projecting laterally from said axis.

3,903,906

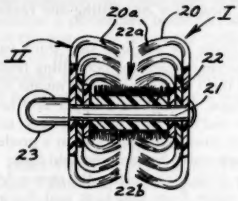
METHOD AND APPARATUS FOR BRUSHING TEETH

George C. Collis, 313 W. 48th St., Minneapolis, Minn. 55409

Filed Mar. 12, 1973, Ser. No. 339,630
Int. Cl. A45d *44/18*
U.S. Cl. 132—84 R **6 Claims**

1. A toothbrush comprising
a handle,
a bristle mounting head connected to said handle,
a cushioning element mounted on said head, and

a plurality of cleaning bristles carried by said head and having certain of said bristles bent to form an acute angle



to the direction of motion produced by up and down chewing action against the cushioning element.

3,903,907

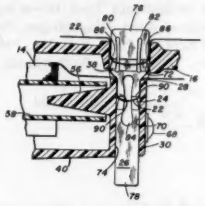
DENTAL FLOSS HOLDER

Heimo A. Knaus, Rt. 3, Box 552-B, Escondido, Calif. 92025

Continuation-in-part of Ser. No. 239,994, March 31, 1972, Pat. No. 3,759,273. This application Apr. 6, 1973, Ser. No. 348,735. The portion of the term of this patent subsequent to Sept. 18, 1990, has been disclaimed.

Int. Cl. A61c *15/00*

U.S. Cl. 132--92 R **9 Claims**



1. A dental floss holder, comprising in combination:

A. means forming:

1. a hollow casing for receiving a spool of dental floss, said casing having:

a. an end wall having:

i. an orifice through which dental floss is threadable,

b. a passage extending transversly of and through said hollow casing and communicating with said orifice,

c. a fork connected with the end wall, said fork having:

i. a pair of tines, each of said tines having a means in the end thereof for retaining a section of dental floss, said means in the end of said tines for retaining a section of the dental floss comprising an opening and opposed spring arms self-biased into contact with each other and defining a one-way gate into said opening,

ii. means adjacent the junction of said tines and forming a guide for the floss,

B. a shiftable bar-lock in said passage, said bar-lock having:

1. a channel extending transversly of the bar-lock and alignable with said orifice for receiving a section of the dental floss,

2. a second channel disposed parallelly of the first mentioned channel in the lock for receiving another section of the dental floss, said bar-lock being shiftable from a position in which the second channel lies outside said transverse passage in the hollow casing to a position in which the first mentioned channel in the lock is in non-aligned position with the orifice in the end wall and in which the second mentioned channel in the lock extends into the transverse passage in the hollow casing, the width of the lock and the width of the walls forming the transverse passage in the hollow casing being such so as to lock both sections of the floss between the walls of the bar-lock and the walls of the transverse passage when the bar-lock has been moved to the second mentioned position.

3,903,908

SLIDE STAINING APPARATUS

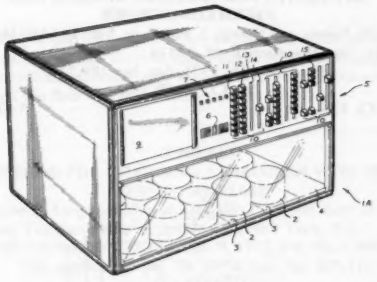
John Logue, Pangbourne, and Michael J. Coulson, Stokenchurch, both of England, assignors to Columbia Industrial Developments Limited, Slough, England

Filed Oct. 31, 1973, Ser. No. 411,586

Claims priority, application United Kingdom, Nov. 1, 1972, 50405/72

Int. Cl.[2] B65G *49/02;* **B05C** *3/10*

U.S. Cl. 134—57 R **4 Claims**



1. A device for treating a specimen by immersion in a plurality of liquids, which comprises:

a housing having a base,

a series of adjacent trays slideably mounted on said base within said housing so as to be individually moveable into and from said housing,

a plurality of containers for liquids carried on each of said series of said adjacent trays,

moveable carrier means mounted in said housing disposed above said containers,

lowering means moveably disposed on said carrier means adapted to hold said specimen for immersing said specimen in a preselected container,

drive means connected to said carrier means adapted to move said lowering means to a predetermined position above said preselected container,

a first traversing means mounted in said housing and adapted to move along a horizontal first axis,

a second traversing means connected to said first traversing means said second traversing means adapted to move along a horizontal second axis perpendicular to said first axis and to support said lowering means,

timing means responsive to said lowering means for indicating said specimen immersed in said container,

means for determining a preselected sequence of positions along said first axis,

means for determining a preselected sequence of positions along said second axis,

means for determining the location of said lowering means along said first and second axis,

means for counting said preselected sequence of positions along said first and second axis, and

analyzer means responsive to said means for determining a preselected sequence of positions, said location determining means and said means for counting.

control means responsive to said analyzer means connected to said drive means for controlling said drive means to position said lowering means in said preselected sequence,

means for determining a preselected sequence of immersion times, and

control means responsive to said sequence of immersion times means and timing means connected to said lowering means for controlling the duration of immersion,

whereby a specimen is transported through a preselected sequence of treatments by immersion for an effective time in a plurality of liquids and said lowering means is moved directly from a position above one preselected container to a position above another preselected container according to the preselected sequence of movement.

3,903,909

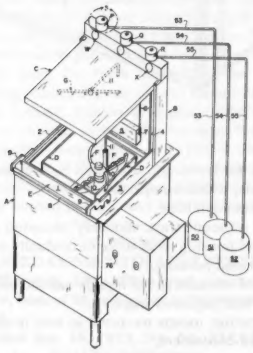
APPARATUS FOR WASHING, RINSING, AND STERILIZING DISHES

Tore H. Noren, and George J. Federighi, both of 1350 Donner Ave., San Francisco, Calif. 94124

Filed Oct. 15, 1971, Ser. No. 189,711

Int. Cl.[2] B08B *3/02*

U.S. Cl. 134—58 D **5 Claims**



1. A dishwashing machine comprising:

a. a tank for holding hot water;

b. a dishwashing compartment adapted to receive dishes to be washed;

c. an upper wash and rinse arm mounted in said compartment and positioned below any dishes receivable in the compartment;

d. a lower wash and rinse arm mounted in said compartment and positioned below any dishes receivable in the compartment;

e. a motor driven pump having a first water conveying means communicating with the water in said tank and delivering this water to said upper wash and rinse arm, and having a second water conveying means communicating with said tank for drawing water therefrom and for forcing it through said first and second water conveying means for causing the water to be sprayed through both of said upper and lower wash and rinse arms and all of it returned to said tank;

f. a source of hot fresh water under pressure with a valve-controlled third water conveying means communicating with a portion of said first and second water conveying means for delivering the hot water to both of said wash and rinse arms when said valve is opened;

g. a first check valve in said third valve-controlled water conveying means for preventing any reverse water flow therein;

h. a timing cycle for opening said third valve-controlled water conveying means for permitting fresh hot water to enter said third water conveying means for causing this water to issue through said upper and lower wash and rinse arms and then flow into said tank; and

i. a switch for closing the valve when a predetermined volume of fresh water has entered said tank;

j. said timing cycle then starting the motor driven pump for removing water from said tank and forcing it into said first and second water conveying means for forcing the water out through both wash and rinse spray arms and into said tank for recirculating the water, said first check valve preventing any of this water from reversing its flow through the third valve-controlled fresh water conveying means.

3,903,910

DEVICE FOR WASHING POTATO CUTTINGS

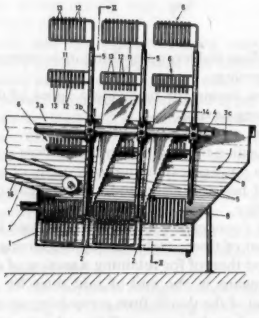
Hendrikus Hermanus Johannes van Remmen, Zetten, Netherlands, assignor to Instituut Voor Bewaring en Verwerking Van Landbouwprodukten, Wageningen, Netherlands

Filed Sept. 5, 1973, Ser. No. 394,467

Claims priority, application Netherlands, Sept. 8, 1972, 7212273

Int. Cl. B08b *3/04*

U.S. Cl. 134—60 **7 Claims**



1. Device for washing potato cuttings comprising a stationary mounted trough being divided into at least three compartments positioned one behind the other with the aid of non-perforated partitions, in which the supply of washing water and the supply of cuttings to be washed are situated at opposite ends of the trough and the water flows over the partitions in countercurrent direction to the direction of advancement of the cuttings, and a rotation shaft provided across the trough in longitudinal direction, to which shaft in each compartment a number of arms have been secured, said arms at their ends being provided with a blade, characterized in, that the portion (*2a*) of the partitions which lies in front of the rising part of the paths described by the arms is considerably higher than the other part (*2b*) of the partitions such that the thrust of water caused by the rotating arms (5) and blades (6) will not lead to an excessive flow of water over the portion (*2a*) of the

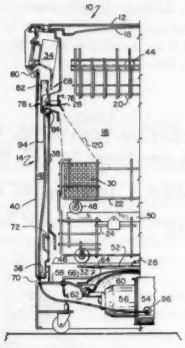
partition while water is free to flow over the portion (2*b*) of the partition, that in at least two of said compartments an inclined sliding chute (14) has been provided the lower end of which is at approximately the upper edge of the lower portion (2*b*) of a partition, a perforated blade (6) shaped to lift the cuttings out of the water and retain the cuttings on the blade so that they fall on the upper portion of said inclined sliding chute (14) whereby the cuttings are conveyed into the next compartment substantially without excess water.

3,903,911

DISHWASHER SPRAY SYSTEM

Lauren W. Guth, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Nov. 21, 1973, Ser. No. 417,777
Int. Cl.[2] B08B *3/02*
U.S. Cl. 134—148 **6 Claims**



5. A dishwasher having a wash/rinse cycle and a dry cycle, comprising

means providing a wash chamber including a door having an inner apertured panel exposed to the wash chamber and an outer panel providing therebetween a door compartment;

means including a pump for spraying liquid into the wash chamber;

a silverware receiver in the wash chamber below the inner panel aperture; and

means for spraying liquid downwardly on the silverware receiver during the wash/rinse cycle including a conduit having an opening defining a generally horizontal path of water movement through the inner panel aperture, a baffle disposed across the path of water movement, means mounting the baffle for swinging movement from a generally vertical position toward an inclined position under impact of water emitting from the opening for diverting the path of water movement generally vertically toward the silverware receiver, and means for delivering water from the pump to the conduit.

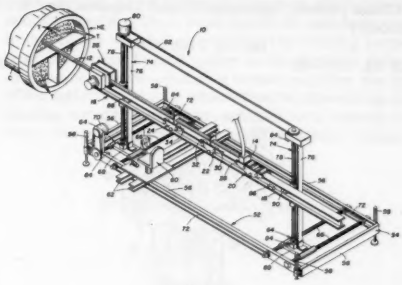
3,903,912

TUBE CLEANING SYSTEM

Charles O. Ice, Jr., Long Beach, and Earis Ray Shanklin, Torrance, both of Calif., assignors to Hydro-Vel Services, Inc., Monahans, Tex.

Division of Ser. No. 73,130, Sept. 17, 1970, Pat. No. 3,794,051. This application Feb. 25, 1974, Ser. No. 445,250
Int. Cl. B08b *3/02, 9/02*
U.S. Cl. 134—167 C **4 Claims**

1. The tube cleaning system comprising: an elongate, straight, tube cleaning lance, and means for reciprocating the lance into and out of tubes to be cleaned and for simultaneously maintaining the straightness of the lance wherein the lance reciprocating and straightness maintaining means in-



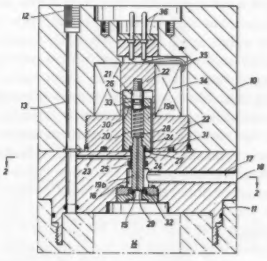
cluding a pair of rollers which engage the lance at spaced points on one side thereof, and a third roller that engages the lance on the opposite side thereof at a point positioned between the first two points axially of the lance.

3,903,913

METHOD FOR CHARGING A CHAMBER WITH HIGH PRESSURE FLUID

Charles F. Umphenour, and Reynaldo Calderon, both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 224,735, Feb. 9, 1972, Pat. No. 3,800,832. This application Jan. 28, 1974, Ser. No. 437,116
Int. Cl.[2] F16K *11/02*
U.S. Cl. 137—1 **3 Claims**



1. A method for charging a chamber with high pressure fluid and for quickly releasing the fluid with a minimum force comprises the steps of,

a. plugging an opening in one side of the high pressure fluid chamber with one end of a hollow elongated plunger valve,

b. charging the chamber with high pressure fluid longitudinally through the center of the hollow elongated closed plunger valve,

c. retracting the hollow plunger valve from the side of the high pressure fluid chamber for quick release of the high pressure fluid from the opening in the side of the chamber, and

d. maintaining substantially no fluid flow through the hollow plunger valve during the quick release of the high pressure fluid.

3,903,914
GAS RELEASE VALVE

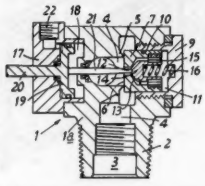
Hubert John Topham-Clements, Northolt, England, assignor to The Walter Kidde Company Limited, Northolt, England

Filed Nov. 8, 1972, Ser. No. 304,784

Claims priority, application United Kingdom, Nov. 8, 1971, 51844/71

Int. Cl. F16k *13/04*

U.S. Cl. 137—68 **3 Claims**



1. A gas release valve comprising a valve body having a gas inlet, a gas outlet, a gas flow passage extending from the inlet to the outlet, a main valve seat surrounding a main valve opening intermediate the ends of the flow passage, and a first chamber disposed at the upstream side of the valve, an annular main valve member slidably mounted in the chamber for movement to engage and disengage from the main valve seat to close and open the valve, said valve member projecting laterally beyond the valve seat to provide a portion whereon the gas pressure upstream of the main valve seat can act in a sense to open the valve, the chamber being in restricted communication with the gas flow passage at the upstream side of the main valve seat so that, when the valve is closed, the chamber is pressurized in a sense to press the main valve member against the main valve seat, said annular main valve member having a central opening which places the chamber in communication with the flow passage at the downstream side of the main valve seat and which is bounded by a pilot valve seat, a pilot valve member disposed at the upstream side of the pilot valve seat and resiliently loaded into engagement with the pilot valve seat, said valve body having a by-pass passage opposite ends of which open to flow passage upstream and downstream respectively of the main valve seat and a safety bursting disc blocking said by-pass passage, the valve body further including a cylinder which is coaxial with said first chamber but which is sealed therefrom and from the flow passage, a piston slidably mounted in the cylinder, a rod extending between the piston and the pilot valve member and slidably mounted in the valve body, said cylinder having an inlet port for the supply of pressure fluid to the cylinder to operate the piston and said rod to lift the pilot valve member off the pilot valve seat against the resilient loading on the pilot valve member, and a manually operable lever mounted externally of the valve body and operatively connected to the piston for enabling the pilot valve member to be lifted from the pilot valve seat by operation of the lever.

3,903,915
VALVE ASSEMBLY

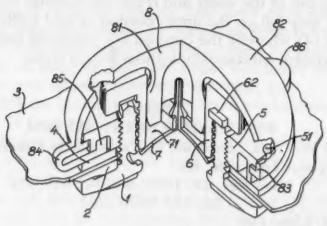
Guy F. Rosaz, Pontarlier, France, assignor to Scovill Manufacturing Company, Waterbury, Conn.

Filed Feb. 7, 1974, Ser. No. 440,534

Int. Cl. F16k *15/20*

U.S. Cl. 137—232 **11 Claims**

1. A valve assembly for inflatable envelopes and the like, comprising a valve body having an enlarged head and an externally screw threaded shank with a through bore, a nut threadably engaged on said shank and adapted to grip the wall of an envelope between the nut and said head of the valve body with a sealing elastic eyelet disposed between said head of the valve body and said wall, a valve-carrying sleeve mounted within said bore of the valve body with a sealing joint disposed between said sleeve and the valve body, a valve-forming resilient washer mounted within said sleeve and



stressed against a seating on said sleeve, and a stopper covering said sleeve and said nut, the stopper including a resiliently deformable central stud sealably press-fitted in said sleeve and a peripheral part fitted about said nut.

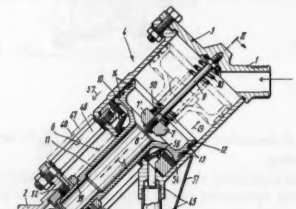
3,903,916
BACKFLOW PREVENTER VALVE

Alfred Waletzko, Zum Berger See 137, 582 Gevelsberg, Germany

Filed July 1, 1974, Ser. No. 484,964

Int. Cl. F16k *41/10*

U.S. Cl. 137—312 **9 Claims**



1. A backflow preventer valve for connecting an inlet conduit to an outlet conduit, said valve comprising:

a generally cylindrical inlet compartment connectable to said inlet conduit;

an outlet compartment spaced from said inlet compartment and connectable to said outlet conduit;

a connecting tube having one end formed as a piston received in said inlet compartment and another end receivable in said outlet compartment, said piston being formed with at least one circumferential groove turned toward the interior of said inlet compartment;

a synthetic-resin seal ring loosely received in said groove and having a low coefficient of friction and high resistance to wear;

a spring urging said tube into a position with said other end spaced from said outlet compartment, whereby fluid pressure in said inlet compartment above a predetermined level holds said tube in a flow position with said other end in said outlet compartment for fluid flow between said compartments; and

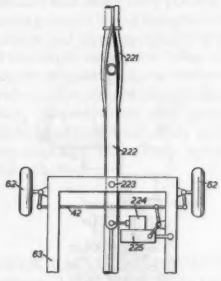
a valve body in said inlet compartment sealingly engageable over said one end of said tube on displacement thereof from said flow position.

3,903,917

FLEXIBLE HOSE PIPES

Ainsley Neville Ede, 36 Thornton Way, Cambridge, England

Filed June 29, 1973, Ser. No. 374,978
Int. Cl.[2] F16L 27/00
U.S. Cl. 137—355.12 3 Claims



1. A water supply system for a movable ground irrigator vehicle, which comprises:

a longitudinally-seamed hose pipe formed of a length of strip material whose longitudinal edges have mutually-interengageable continuous longitudinal edge formations, the strip material being curled longitudinally transversely to its length with said edge formations inter-engaged to form a substantially watertight seam extending along substantially the whole length of the hose pipe, the seamed hose pipe being laid out on the ground along a predetermined line and being connected to a supply of water under low pressure whereby the seamed hose pipe is filled with water and inflated by the internal low water;

a movable ground irrigator vehicle with steerable ground wheels;

propelling means on the vehicle for moving said vehicle in a direction along the length of the laid-out hose pipe;

a former device carried by the vehicle for movement therewith, said former device having a leading end and a rear end and being engaged with said inflated hose pipe in longitudinally-slidable relationship therewith;

said former device including means which firstly coact with the said edge formations of the seamed pipe to progressively disengage and part said ecges adjacent to the leading edge of the former deivce, and which then coact with said edge formations to progressively bring together and re-engage said edges adjacent the rear end of the former device, thereby producing between the said front and rear ends of the former device a local opening in said seam, said local opening travelling progressively along the length of the hose pipe together with the former device and between said front and rear ends thereof as the vehicle travels along the laid-out hose pipe;

a booster pump mounted on said vehicle and having a water inlet and a delivery outlet;

conduit means carried by said vehicle and connected at its one ned to the water inlet of the pump and at its other end to the former device between said leading and rear ends thereof, said conduit withdrawing water from the interior of the hose pipe through said local opening in the seam and supplying said withdrawn water to the inlet of the pump for delivery at increased pressure from the delivery outlet of the pump;

the vehicle being provided with a servo-controlled power steering system coupled to its steerable wheels and arranged to steer said wheels in response to steering command signals supplied to said system;

the former device being movably mounted on the vehicle in directions transverse thereto;

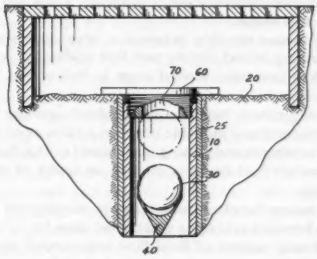
guide means carried by the vehicle and sensitive to relative transverse displacements between the former device and the vehicle as the advancing vehicle move the former device along the length of the laid-out hose pipe, said guide means including means for generating input signals corresponding to said relative transverse displacements and for supplying these input signals to said servo-controlled power steering system, whereby steering corrections are applied by said system to the steerable ground wheels to cause the advancing vehicle to follow the line of the laid-out hose pipe while advancing therealong and drawing water therefrom through said local opening between the leading and rear ends of said former device.

3,903,918

DRAIN WITH CHECK VALVE

Clarence L. Carnarius, 215 N. Main St., Kenton, Ohio 43326

Filed Aug. 19, 1974, Ser. No. 498,517
Int. Cl.[2] F16K 31/22
U.S. Cl. 137—433 2 Claims



1. A drain comprising:

a vertical hollow pipe;

a bouyant spherical ball located inside the pipe and having a diameter less than the inside diameter of the pipe so as to be free to move up and down inside it;

an upper stop in the top of the pipe for limiting the upward movement of the ball and preventing the influx and efflux of water into and from the pipe when the upward movement of the ball has been physically checked by the upper stop, the upper stop taking the form of a plug threaded into the top of the pipe, the plug bearing a cylindrical cavity smaller in diameter than the diameter of the ball extending through it concentrically with the inside of the pipe and bearing two opposed tabs extending radially outwardly from its center on its upper surface; and

a lower stop in the pipe below the upper stop for limiting the downward motion of the ball while allowing water to flow upwardly or downwardly past the lower stop and preventing the air pressure head from raising the ball and thus closing the drain before the arrival of flood water, the lower stop taking the form of a U-shaped member welded into the pipe with the open side of the U facing upwardly and extending a substantial distance across the pipe so as to contact the pipe at four separated locations.

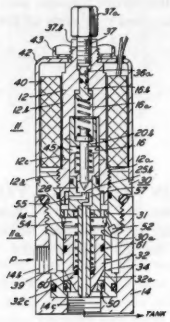
3,903,919
TWO STAGE SOLENOID OPERATED VALVE ASSEMBLY WITH RELIEF FUNCTION

Kenneth W. Zeuner, Newtown, Pa., assignor to Control Concepts, Inc., Newtown, Pa.

Continuation-in-part of Ser. No. 245,929, April 20, 1972, Pat. No. 3,799,497. This application June 21, 1973, Ser. No. 371,996

Int. Cl. F16k *31/383, 31/40*

U.S. Cl. 137—489 **11 Claims**



1. A two stage solenoid operated valve assembly providing a relief function comprising

a first and a second orifice for respectively a first and a second of said two stages,

first plug means movable between a valve open state and a state seating in and closing said first orifice for controlling fluid flow from said second stage to below said first plug means,

second plug means having a longitudinal opening over the length thereof and movable between a valve open state and a state seating in and closing said second orifice for controlling flow of fluid from an inlet to an outlet of said valve assembly,

solenoid means for electromagnetically moving said first plug means between said open and closed state for actuating by way of said control of fluid flow said second plug means respectively between said open and closed state,

a tubular flow passage separate from said first orifice and in fluid communication with said first stage above said first plug means being received within said longitudinal opening for providing fluid flow from above said first plug means directly into said outlet of said valve assembly, said tubular flow passage having one end rigidly secured with respect to said first stage and having the other end and adjacent surface floating and nonfixed, and

range spring means tending to bias said first plug means towards said closed state whereby with said first plug means in said closed state when the force of fluid under said first plug means is sufficient to overcome the resilient force of said range spring means said first plug means opens thereby providing said relief function.

3,903,920
HYDRAULIC FLOW CONTROL ASSEMBLIES

Robin Adam Cochrane, Haseley Knob, England, assignor to Girling Limited, Birmingham, England

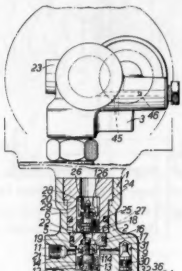
Filed July 26, 1972, Ser. No. 275,352

Claims priority, application United Kingdom, July 31, 1971, 36100/71

Int. Cl. F16k *15/06*

U.S. Cl. 137—512 **9 Claims**

1. An hydraulic control valve assembly for a vehicle system comprising a housing having an inlet for hydraulic fluid, an outlet, and a valve for controlling communication between said inlet and said outlet wherein said valve comprises a head, a seating surrounding passage means communicating with said inlet, an abutment member having a central opening, a stem carrying said head and projecting through said central opening in said abutment member, a shroud through which said stem projects and in which said head is located, a resilient connection between said head and said shroud, and a spring acting between said abutment member and said shroud, and wherein



a free end of said stem remote from said head is provided with an integral enlargement member of a diameter slightly greater than that of said opening in said abutment member and one of said members is constructed from a resilient material which is deformable to permit said enlargement member to pass through said opening whereby said head and said stem, said shroud, said spring and said abutment member are coupled together and define a sub-assembly.

3,903,921
VALVE PLATE COMPONENT WITH SPRING-ARM STRUCTURE

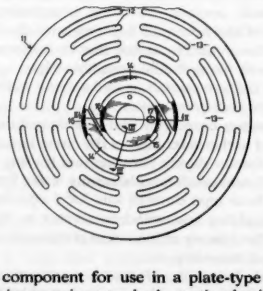
Donald Brookman, Helsby, England, assignor to The Metallic Valve Company Limited, England

Filed Dec. 11, 1973, Ser. No. 423,766

Claims priority, application United Kingdom, Dec. 15, 1972, 57920/72

Int. Cl. F16k *15/10, 15/12*

U.S. Cl. 137—516.13 **7 Claims**



1. A plate component for use in a plate-type non-return valve, comprising a main outer body portion having an inner circular periphery, at least one spring arm integral with said outer body portion and extending inwardly from said inner periphery thereof with said spring arm including at least one curved portion terminating in an inner end distant from said

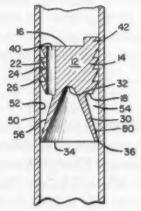
inner periphery of said outer body portion, inner mounting means having an outer periphery extending along at least part of a circle which is concentric with and surrounded by said inner circular periphery of said outer body portion, and said peripheries of said outer body portion and inner mounting means respectively extending along circles which define between themselves an annular region separating said inner mounting means and said outer body portion from each other, said inner mounting means being integral with said inner end of said spring arm at said outer periphery of said inner mounting means, and the whole spring arm lying within said annular region and being of reduced thickness relative to the thickness of said main body portion except at a junction with said inner circular periphery thereof where said spring arm has along said inner periphery of said main body portion a transition surface merging into said main body portion at said inner circular periphery thereof.

3,903,922

UNITARY CHECK VALVE AND RETAINER THEREFOR

Thomas P. Buckman, 11561 Shelly Vista Dr., Tujunga, Calif. 91042

Filed Apr. 3, 1974, Ser. No. 457,486
Int. Cl.[2] F16K *15/14*
U.S. Cl. 137—525 **3 Claims**



1. A unitary check valve of resilient material adapted for positioning within a tubular member for controlling flow therethrough, said check valve comprising a retainer portion having a cylindrical body including a top and bottom connected by a vertical side wall, said cylindrical body having a length at least as great as its diameter, a plurality of circular rows of barbs on the vertical side wall from the top to the bottom thereof for engaging and gripping the inner wall of the tubular member adapted to receive the check valve,

a cone-shaped valve integral with and extending from the bottom of the cylindrical body of the retainer, said cone-shaped valve having its apex adjacent the bottom of the cylindrical body whereby the cone flares downwardly and outwardly, the edge of the open end of the cone-shaped valve being sized to snugly engage the inner wall of the tubular member in which the valve is positioned,

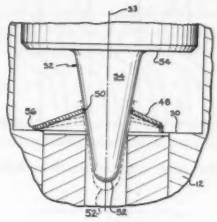
and passage means in the cylindrical body of the retainer to allow liquid to flow by the body from the top to the bottom and pass into the annular space defined by the inner wall of the tubular member and the outer surface of the cone-shaped valve whereby when the pressure in this space is sufficient to deflect the valve and pull the edge of the valve away from the inner wall of the tubular member liquid will flow therepast.

3,903,923

STABILIZED RELIEF VALVE

Ronald L. Loup, Clarkston, and Samuel C. Walker, Ann Arbor, both of Mich., assignors to Double A Products Company, Manchester, Mich.

Filed Mar. 11, 1974, Ser. No. 449,954
Int. Cl.[2] F16K *15/02, 15/04*
U.S. Cl. 137—539.5 **13 Claims**



1. A valve having a valve body with an inlet port, an outlet port and a passageway extending between said inlet port and said outlet port, seat means defining a seat member providing an opening in said passageway, a valve means in said passageway normally seated on said seat member for closing the passageway and movable along an axis toward and away from said seat member, said valve means being spaced from said passageway except for engagement with said seat member, a coil spring operably mounted at its opposite ends between said valve means and said valve body urging said valve means to its seated position and located so that when the valve member is seated the coil spring axis is coincident with the axis of movement of the valve means, said coil spring being spaced from said passageway except for its mounting engagement at one end with said valve body, and an annular stabilizer element encircling said valve means and positioned between and in engagement with said seat means and said valve means maintaining frictional engagement therebetween, said annular stabilizer element being resilient in the axial direction to allow it to expand and contract axially for maintaining said frictional engagement when the valve means is in an open position and being stiff in the radial direction to restrain it from movement laterally so that when the valve means is in an open position the stabilizer element will restrain frictionally lateral displacement of the valve means relative to the seat means.

3,903,924

COMPARTMENTED FUEL TANK

John Readman, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed July 23, 1973, Ser. No. 381,725
Int. Cl.[2] B64D *37/00*
U.S. Cl. 137—574 **8 Claims**

1. A compartmented fuel tank, comprising,

a. a container having a longitudinal axis and a cross section transverse to the longitudinal axis which is relatively wide at the top and relatively narrow at the bottom,

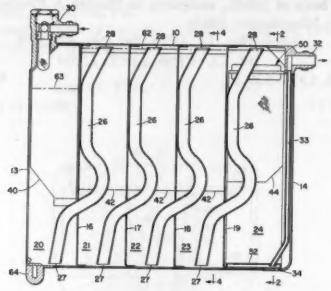
b. an outlet communicating with the bottom of the container at one end for discharging fuel,

c. an inlet communicating with the top of the container at the opposite end for supplying gas to pressurize the container,

d. a plurality of transverse walls in the container dividing the container into a plurality of separate successive sealed compartments between the inlet and the outlet, and

e. a plurality of tubes each having a diameter approximating that of the outlet for substantial fuel flow therethrough with one of said tubes extending through each of said

transverse walls from the bottom of the preceding compartment to the top of the succeeding compartment and



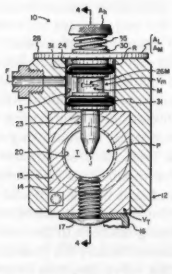
providing the sole communication between compartments.

3,903,925

CARBURETOR FUEL METERING VALVE WITH MID-RANGE FUEL ADJUSTMENT

John C. Perry, 971 Mira Mar Dr., Vista, Calif. 92083

Filed July 20, 1973, Ser. No. 381,013
Int. Cl.[2] F16K *11/085*
U.S. Cl. 137—625.3 **10 Claims**



1. A carburetor fuel metering valve comprising:

a pair of slidably interfitting valve sleeves which are relatively rotatable to a plurality of mid-range fuel adjustment settings and are relatively rotatable at each mid-range setting through an operating fuel metering range between idling and full speed positions,

said sleeves having fuel metering ports which overlap at each mid-range setting to form a fuel metering orifice whose effective area is varies by relative rotation of the sleeves through the corresponding fuel metering range, and

said sleeves being relatively rotatable to corresponding fuel metering positions within the fuel metering ranges and the fuel metering ports being so sized that the effective orifice areas differ at said corresponding fuel metering positions.

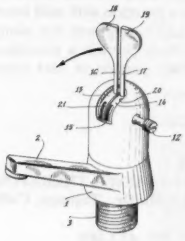
3,903,926

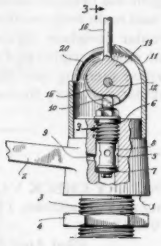
MIXING TAP WITH INDEPENDENT HOT AND COLD WATER FLOW CONTROLS

Aurora Kempler nee Constantinesco, 5, rue Maurice Baes, La Varenne, (Val de Marne), France

Filed July 19, 1973, Ser. No. 380,709
Claims priority, application France, July 31, 1972, 72.27544
Int. Cl. F16k *19/00*
U.S. Cl. 137—637 **3 Claims**

1. In a mixing tap with independent control of the flow of the hot and cold water wherein a tap body is provided is provided with two flow-regulating valves, said two flow-regulating valves being connected to the hot and cold water supply, respectively, and both being connected to a common water outlet spout, said two flow-control valves being paired with two corresponding controls, each of which has a movable control handle which is movable independently of the other control handle, the improvement comprising said two controls





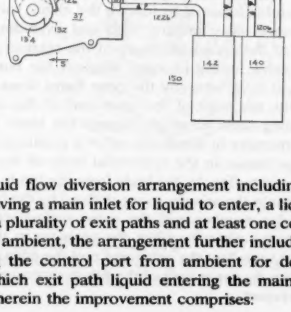
being constituted by two closely spaced coaxial cams which are displaceable over close parallel trajectories with the same directional sense of actuation, the respective edge faces of said two cams being formed with profiled notches, said two valves having respective slidable obturators positioned in parallel relationship in the base of the tap body, and said slidable obturators each having an off center cam-follower end engaging into the respective profiled notches.

3,903,927

LIQUID FLOW DIVERSION ARRANGEMENT

Ved P. Gakhar, and Lawrence P. Dendinger, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 15, 1973, Ser. No. 406,577
Int. Cl.[2] F15C *1/04*
U.S. Cl. 137—836 **7 Claims**



1. A liquid flow diversion arrangement including a liquid diverter having a main inlet for liquid to enter, a liquid outlet providing a plurality of exit paths and at least one control port coupled to ambient, the arrangement further including means for closing the control port from ambient for determining through which exit path liquid entering the main inlet will emerge, wherein the improvement comprises:

means associated with the control port for preventing the emergence therefrom of liquid; and

means coupled between the control port and its closing means for accumulating liquid that may bypass the preventing means and for preventing audible sonic oscillations in the liquid flow diversion arrangement.

3,903,928

VEHICLE EXHAUST TUBING

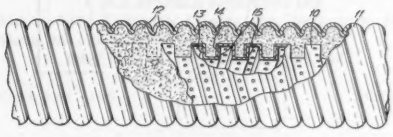
William Fillans Sykes, Gerrards Cross; Anthony Joseph Weeden, Marlow, and Ian Martin Cleare, High Wycombe, all of England, assignors to Smiths Industries Limited, London, England

Filed Aug. 15, 1973, Ser. No. 388,712

Claims priority, application United Kingdom, Aug. 15, 1972, 37990/72

Int. Cl.² F16L *9/06, 9/14, 11/12*

U.S. Cl. 138—109 **9 Claims**



1. An exhaust pipe for a motor vehicle wherein at least a major part of the length of the exhaust pipe is constituted by tubing which is capable of being bent and retaining a bent shape and which comprises spaced inner and outer tubular members which are concentric with one another, a layer of compressed sound-absorbing material filling the volume between the spaced tubular members, each of said tubular members being corrugated to facilitate said bending of the tubing, the corrugations extending completely around the respective tubular member and extending substantially transversely of the of the length of the tubing with the corrugations on at least one of the tubular members being in the form of a helix centered on the longitudinal axis of the tubing, the inner tubular member being perforated for passage of sound waves generated in said inner tubular member into said compressed sound-absorbing material to be attenuated therein, the outer tubular member being substantially gas-tight, and a pair of end fittings mounted on the opposing ends respectively of the tubing, each end fitting comprising a corrugated sleeve portion concentric with said tubular members, the corrugations of said sleeve portion mating with the corrugations of one of said corrugated tubular members, each end fitting including an annular wall integral with said sleeve portion and positioned to extend across the space between said tubular members thereby to close the respective end of the volume between the said spaced tubular members, and each end fitting further including a hollow tubular element communicating with the interior of said inner tubular member and mounted on the said annular wall to extend outwardly from the respective end of the tubing in a direction parallel to the longitudinal axis of the tubing.

3,903,929

IRRIGATION CONDUIT

Donald E. Mock, Covina, Calif., assignor to Anjac Plastics, Inc., El Monte, Calif.

Filed Nov. 10, 1971, Ser. No. 197,242

Int. Cl.² F16L *11/012*

U.S. Cl. 138—115 **4 Claims**

1. An irrigation conduit which comprises:

first and second seamless, integral tubes of a flexible imporous, polymer material,

said first tube having a circular cross-sectional configuration when subjected to water pressure,

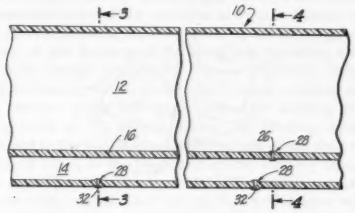
said tubes having a uniform cross-sectional configuration along their length,

said tubes having a common wall separating their interiors serving as a wall for both of their interiors,

said second tube having a non-circular cross-sectional configuration and including a wall extending outwardly from said first tube which is attached to said first tube at the opposed edges of said common wall,

a first series of holes of uniform diameter uniformly spaced from one another in said common wall placing the interiors of said tubes in communication with one another.

a second series of holes of uniform diameter uniformly spaced from one another in said second tube leading from the interior of said second tube to the exterior of said conduit,



said first tube being capable of receiving water under pressure and distributing it to the interior of the second tube through said holes of said first series,

said holes of said first series being sufficiently small so as to cause a pressure drop as water is distributed from the interior of said first tube to the interior of said second tube,

said holes in said second tube being capable of distributing water from the interior of said second tube to the exterior of said conduit,

the totle area of said holes of said second series being greater than the total area of said holes of said first series so that water can escape more easily from the interior of said second tube to the exterior of said conduit than water can flow from the interior of said first tube to the interior of said second tube.

3,903,930

WEFT SELECTOR FOR SHUTTLELESS WEAVING MACHINE

Jakob Muller, Zwidelli, Switzerland, assignor to Patax Trust Reg., Liechtenstein

Filed May 31, 1974, Ser. No. 475,183

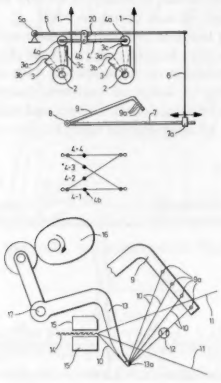
Claims priority, application Switzerland, June 1, 1973, 7923/73

Int. Cl.² D03D *47/38*

U.S. Cl. 139—122 W **1 Claim**

1. In a shuttleless web weaving machine, for weaving a web with at least two different weft threads, and provided with fork-shaped weft thread input feeder means and with weft thread positioning means including a displaceable thread guide member and a movable presser foot operable to position a selected weft thread in front of the input feeder means, weft thread selector means comprising, in combination, three oscillatably mounted cam discs, each having an arcuate profile, each selectively angularly displaceable about a respective axis between two discrete operative positions; and follower means coupled to said thread guide member and including three follower members each engaged with and operable by a respective cam disc; the arcuate profile of each cam disc having two end portions each engageable with the associated follower member in a respective one of said two discrete operative positions of the cam disc; each said end portion being substan-

tially concentric with the axis of its respective cam disc; said thread guide member having eight weft thread guiding eyelets,



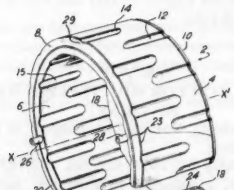
whereby a selective one of eight different weft threads is positionable in front of said input feeder means.

3,903,931

SLEEVE HAVING DEFORMABLE WALLS

Maurice Moulin, Palaisfau; Michel Roze', Saint-Cyr-L'Ecole, and Jean Vivien, Les Clayes Sous Bois, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed June 25, 1973, Ser. No. 372,930
Claims priority, application France, July 3, 1972, 72.24000
Int. Cl. F16l *9/02, 9/22*
U.S. Cl. 138—148 **4 Claims**



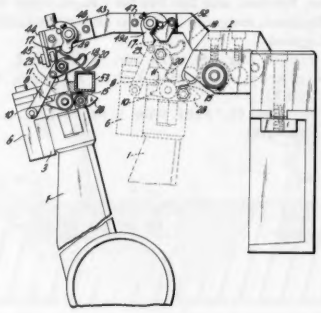
1. A hollow sleeve surrounding a duct having the shape of a hollow ring of revolution, two spaced deformable coaxial walls for said sleeve, said walls being an inner and outer wall, two curved wall extensions having the same axis as said walls welded to and connecting and sealing said walls, preformed resilient corrugations in each of said walls uniformly spaced ove the periphery of each of said walls, the axis of each of said corrugations being parallel to that of said sleeve and the length of each of said corrugations being slightly greater than one-half the height of said sleeve, said corrugations opening alternately on opposite ones of said curved extensions and means for applying pressure within said sleeve to expand said sleeve into contact with the duct.

3,903,932

CUTTING, CLAMPING AND WEFT PRESENTATION MECHANISM FOR LOOMS

D. Anselmo Bolea Camprubi, 55 Tavern St., Barcelona, Spain

Filed July 3, 1974, Ser. No. 485,627
Claims priority, application Spain, July 7, 1973, 193243
Int. Cl.[2] D03D *49/10*
U.S. Cl. 139—303 **10 Claims**



1. A cutting, clamping and weft presentation mechanism for a loom having a batten and a temple comprising a first assembly affixed to said batten and movable therewith, and a second assembly affixed to said temple for activating said first assembly, said first assembly comprising a base block, a means for securing said base block to said batten, plate means having a camming surface and a lug on one face thereof and a projection extending outwardly from the face opposite to said one face, a presenting arm connected in parallel to said plate means for movement therewith, means for rotatably connecting said plate means and presenting arm to said base block, a bar fixedly secured at one end to said base block and in parallel, side-by-side relationship with said plate means and having a knife projecting from the other end, means connecting said bar with said plate means toward said bar, means flanking said plate means and mounted on said base block for braking the rotation of said plate means, and clamping means extending near said first projection of said plate means for clamping a weft prior to cutting.

3,903,933

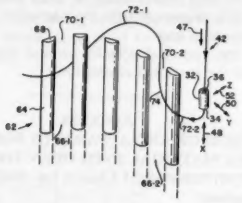
APPARATUS AND METHOD FOR FORMING DYNAMOELECTRIC MACHINE FIELD WINDINGS BY PUSHING

Robert E. Arick, Fort Wayne, Ind., and Ralph A. Vogel, Three Rivers, Mich., assignors to Essex International, Inc., Fort Wayne, Ind.

Division of Ser. No. 331,992, Feb. 12, 1973. This application Oct. 2, 1974, Ser. No. 511,299
Int. Cl. B21f *3/00*
U.S. Cl. 140—92.1 **21 Claims**

1. Apparatus for placing magnet wire in the slots respectively defined by spaced, parallel blades of coil transfer apparatus, said blades lying on an imaginary cylinder having an axis, said blades having distal ends and proximal ends mounted on a support member, said slots having open ends defined by said distal ends, said apparatus comprising means for guiding wire toward said blades, means for continuously pushing wire through said guide means, means for moving said guide means relative to said blades with a motion having components in at least two mutually perpendicular directions

in a path having sections respectively aligned with at least two of said open slot ends thereby to push said wire into said slots



through said open ends, said path also having sections respectively within and outside of said cylinder.

3,903,934

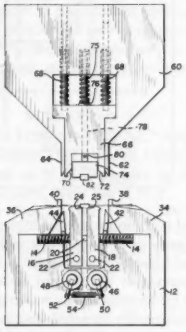
COLLAPSIBLE FORMING DIE

Adam J. Vizy, Cornwells Heights, Pa., assignor to Henry Mann, Inc., Huntingdon Valley, Pa.

Filed Dec. 31, 1974, Ser. No. 537,758

Int. Cl.[2] B21F *1/00*

U.S. Cl. 140—105 **10 Claims**



1. A collapsible forming die for electrical components which are characterized as having at least two leads extending from a tubular or rectangular body with these leads arranged with at least one lead extending from opposite sides or ends of the body, said collapsible die adapted to cut, bend and form with inwardly disposed offsets, in a single stroke operation, the formable leads of the components, said collapsible die including: (a) a base member adapted for mounting to a fixed support; (b) a pair of shear block portions carried by and secured to the base member in a spaced array and at a distance which establishes the cut length of the extending leads of the component prior to bending; (c) a pair of die members pivotally retained on the base member and having their distal ends and outer faces contoured to provide the bending and offset configuration of said cut leads; (d) stop means for limiting the inward swing of the die members toward each other; (e) biasing means for urging the die members toward the stop means; (f) means associated with the die members for nesting the component body and for supporting the extending leads immediately adjacent thereto in a fixed position in relation to the pivotable die members; (g) a pair of lead forming arms carried by the base member, the arms movably secured thereto and with one arm disposed to lie adjacent to the outer side of the first die member and movable toward said outer side and with the other arm disposed to lie adjacent the outer side of the other die member and movable toward said outer side; (h) biasing means for urging the lead forming arms away from the sides of the adjacent die members; (i) means for limiting the outward movement of the arms away from the die member, said outward limit of movement sufficient to provide a free space within which the bending of a lead from its initial condition toward a right-angled bend may be achieved; (j) a forming member reciprocally movable toward and from the base member; (k) a pair of cut off knives carried by the forming member and spaced so as to slide between and close by the shear blocks and in association with these blocks as they pass by to cut the leads of the component to a selected length; (l) a nesting block carried by the forming member and during the time the forming member is moved to its forward position the nesting block engages the immediately adjacent leads of the component and in association with the means for nesting the component carried by the base member retains these leads during cutting, bending and forming of the leads; (m) lead forming end members carried by the forming member and disposed to approach the pivoted die members and in association therewith to bend the cut leads to a desired initial configuration; (n) a camming means carried by the forming member and prior to the forming of the leads said camming means is adapted to engage and move the die members outwardly against the biasing means to the lead forming position, and (o) means carried by the forming member for causing the lead forming arms to be moved during the bending operation toward and to the lead to form with the side of the die member the desired offset in the leads and as the forming member is moved from operative engagement with the components carried by the base member the biasing means associated with the die members and the lead forming arms actuating said die members and arms to move to their repose condition to collapse the die and release the formed leads of the component.

3,903,935

WIRE WRAPPING APPARATUS

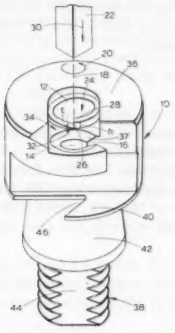
Walter Evelyn Brooke Boothby, East Stanmore, England, assignor to The Post Office, London, England

Filed Aug. 10, 1973, Ser. No. 387,296

Claims priority, application United Kingdom, Aug. 15, 1972, 37944/72

Int. Cl.[2] B21F *3/02, 3/04;* **H01R** *9/14*

U.S. Cl. 140—124 **3 Claims**



1. Apparatus for wrapping serially axially disposed turns of wire onto an axially extending terminal to make an electrical connection therewith, said apparatus comprising a wrapping mandrel rotatable in a first direction to wrap said wire and having a bore formed in a forward end thereof, said bore extending rearwardly to receive the terminal, a recess defined by a wall extending at least partially about said bore to compress wrapped wire onto the terminal, said recess having a wire feed aperture adjacent said bore with said aperture terminating in a slot with the sides defining said slot being conver-

gent with respect to one another for engaging and stripping insulation from the wire drawn through said aperture, wherein the mandrel is formed with thrust means comprising a forwarding projecting step formed ahead of the wire feed aperture in said first direction and a cam surface extending from said step generally rearwardly and around said bore in said first direction to be co-operatively engaged with a last-wrapped turn of wire on the terminal to progress the mandrel along the terminal as the mandrel is rotated to wrap the wire.

3,903,936

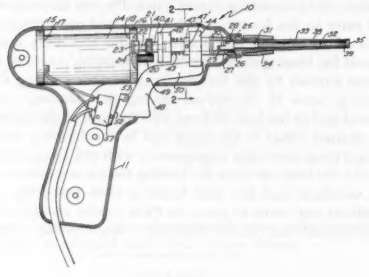
WIRE WRAPPING TOOL

Adolph G. Bergmann, 8 Westwood La., Barrington, R.I. 02806

Filed May 28, 1974, Ser. No. 473,507

Int. Cl.[2] B21F *15/04*

U.S. Cl. 140—124 **10 Claims**



1. A wire wrapping tool comprising
1. a rotary bit
2. a motor
3. a friction clutch having two faces slidably and continuously in engagement through which said motor drives said bit
4. indexing means operably connected to said bit and having an angular index position related to an angular position of said bit
5. control means for said motor which in one position energizes the motor and in another position operates said indexing means.

3,903,937

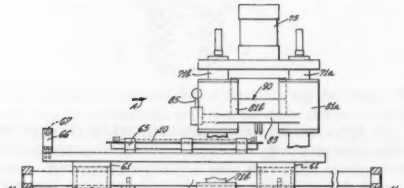
BACK WIRING

Peter R. Drummond, Culver City, Calif., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 743,904, July 10, 1968, Pat. No. 3,603,357. This application Apr. 23, 1971, Ser. No. 136,949

Int. Cl.[2] B21F *1/02*

U.S. Cl. 140—147 **21 Claims**



1. The method for preparing connector pins for backwiring to individually assume particular alignment with particular axes, wherein said pins are arranged in a matrix pattern on a mounting board and anchored thereto, comprising the steps of:

urging the pins individually at their respective tips into respective alignment with the particular axis for each pin if misaligned; and

twisting the pins individually around the respective axis beyond the torsional elastic limit.

3,903,938

METHOD OF AND APPARATUS FOR FILLING FLOWABLE MATERIAL INTO OPEN TOP CONTAINERS

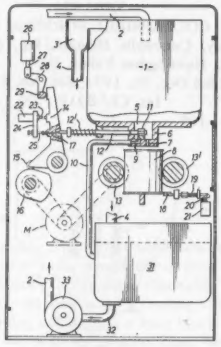
Michael Bryon Osborne, 31 Church La., Kirkella, Hull, Yorkshire, England

Filed Oct. 23, 1973, Ser. No. 408,797

Claims priority, application United Kingdom, Oct. 28, 1972, 49813/72; Mar. 6, 1973, 10696/73

Int. Cl. B65b *3/04*

U.S. Cl. 141—1 **5 Claims**



1. The method of filling material into open top containers moving continuously in a straight line which consists in maintaining a constant head of filling material in a supply tank and feeding said material at a constant total discharge rate to progressively fill said continuously moving containers through a plurality of downwardly directed discharges from said tank, opening said discharges in timed relation to the movement of said containers with progressive alternate closing of a by-pass discharge with the opening of each filling discharge to achieve a constant flow rate, and preventing each discharge valve giving a filling discharge when there is no container therebelow.

3,903,939

FLUIDIC DEPOSITION CONTROL

Charles G. Pickett, Andover, N.J., assignor to Bio-Medical Sciences, Inc., Fairfield, N.J.

Filed Apr. 1, 1974, Ser. No. 457,121

Int. Cl.[2] B65B *3/26;* **F15C** *4/00*

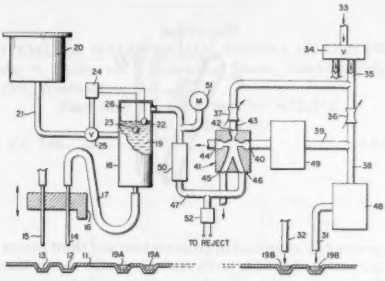
U.S. Cl. 141—1 **8 Claims**

1. In the method of material deposition in a cavity of a surface in which material to be deposited is maintained in a liquid condition in a vessel, and is communicated to a tubular needle which is displaced downward towards the cavity for formation and deposition in the cavity of a globule of the liquid material, the improvement for in-line control of the amount of material deposited which comprises

a. maintaining a source of pressurized fluid in communication with a fluidic probe and with a proportional fluidic element said element comprising a first control port, a second control port, an input port, a first output port and a second output port; said pressurized fluid communicating with said element through the first control port of said element,

b. directing pressurized fluid from said probe towards the surface of solidified deposited material said probe and said surface being in spacial relationship to one another so as to create a back pressure in said probe, changes in said back pressure being sensed by the fluidic element,

c. supplying a pressurized fluid to the input port of the fluidic element,



d. maintaining said liquid material in said vessel under a closed head space and

e. communicating the pressure of the fluid exiting at the second output port of said fluidic element to the vessel head space, the pressure in said head space thereby being increased or decreased proportionally to the decrease or increase respectively of the back pressure in said probe.

3,903,940

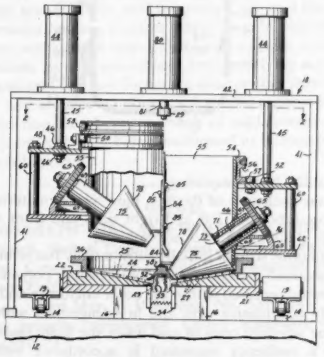
APPARATUS FOR MATERIAL INSERTION

Helmut E. Durr, Chatham Twp., Morris County, and Albert H. Haller, Clark, both of N.J., assignors to Western Electric Company, Incorporated, New York, N.Y.

Continuation of Ser. No. 35,106, May 6, 1970, abandoned, which is a division of Ser. No. 831,001, June 6, 1969, Pat. No. 3,660,161. This application Nov. 12, 1973, Ser. No. 415,072

Int. Cl.[2] H01M *4/73*

U.S. Cl. 141—32 **8 Claims**



1. Apparatus for inserting material into apertures formed in a workpiece, such material having been deposited on the surface of the workpiece, the apparatus comprising:

means for positioning the workpiece adjacent at least one roller;

means for reciprocating the roller toward and away from the surface of the workpiece to move portions of the roller into and out of contact with the material on the surface of the workpiece;

means for displacing the roller over the surface of the workpiece; and

means for positively rotating the roller at a relative velocity to effect curtate cycloidal motion to impart wiping motion between the surface of the roller and the surface of the workpiece to move the deposited material toward the apertures of the workpiece and to generate shear forces between the roller and the material which is both on the surface of the workpiece and in contact with the roller to urge such material to separate from the roller.

3,903,941

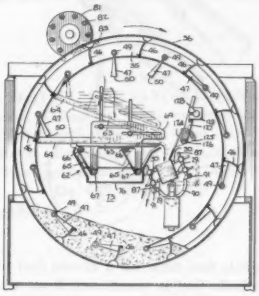
MACHINE AND METHOD FOR FILLING CONTAINERS TO A PREDETERMINED LEVEL

Bernard C. Eisenberg, Rockaway, N.J., assignor to Solbern Corporation, Fairfield, N.J.

Filed July 9, 1973, Ser. No. 377,433

Int. Cl.[2] B65B *1/04, 1/22*

U.S. Cl. 141—78 **23 Claims**



1. In a machine for compactly filling containers with material to a preselected level of the type that includes an elongated support member for conveying containers in a linear path, means for delivering material into the containers from a location above a portion of the linear path, means for tilting the containers to an angle corresponding to the preselected fill level, and means for agitating the containers to pack the material closely in the containers and to eject excess material, the improvement wherein the means for tilting the containers to a predetermined angle comprises:

means for guiding the containers in the portion of the linear path below the material delivery location including

at least one pair of side rails positioned in spaced relation parallel to the portion of the linear path, one rail of each pair being in sliding engagement with one side of each container being conveyed, and the other rail being in sliding contact with the opposite side of each container;

means for supporting the guide means for rotation within predetermined angular limits about an axis approximately coincident with the centerline of the conveying support member including

at least one yoke in the form of a circular arc subtending an angle equal to at least the predetermined angular limits of rotation, means for connecting each end of the yoke respectively to one and the other of each pair of side rails, and

means located at a distance from the centerline of the conveying support member approximately equal to the radius of the circular arc formed by the yoke for holding the yoke at any selectable point between its ends that lies in an arc subtending an angle corresponding to the predetermined angular limits of rotation; and

means for remotely adjusting the container guide supporting means within the predetermined angular limits

to position the container guiding means at the angle corresponding to the preselected fill level, the holding means permitting sliding movement of the yoke relative to the holding means from one of the selectable points to another in response to actuation of the remote adjusting means, the yoke when held at any of the selectable points being approximately concentric with the centerline of the conveying support member.

3,903,942

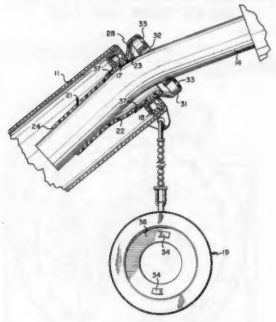
VAPOR SEAL FOR FUEL TANK FILLER TUBE

Eugene W. Vest, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed Nov. 6, 1972, Ser. No. 304,159

Int. Cl.[2] B65B *3/18, 39/02;* **F16J** *15/32*

U.S. Cl. 141—301 **7 Claims**



1. In a vehicle fuel tank for a closed fuel transfer system wherein a volatile fuel is transferred from a storage means therefor to a vehicle tank by way of a dispensing nozzle removably communicated with said vehicle tank, the latter having a filler spout adapted to receive a discharge tube of said dispensing nozzle, the improvement therein for establishing a disconnectable vapor tight seal while said dispensing nozzle and filler spout are in engagement comprising:

an elongated resilient wall adapter having an inlet at one end thereof, and being fixedly retained by a circular neck connected to said filler spout to prevent axial movement therebetween, said adapter having a sealing portion disposed within said filler spout thereby defining an expandable longitudinal passage, the latter being outwardly expandable to form a vapor tight annular seal about said nozzle discharge tube while being spaced from the inner wall of said filler spout thereby defining an annular opening extending the length of said sealing portion when said discharge tube is removably registered in said longitudinal passage, and said adapter being laterally displaceable along said sealing portion into said annular opening to allow a limited degree of pivotal movement of said dispensing nozzle of circular neck when said nozzle discharge tube is so registered within said filler spout,

whereby volatile fuel vapors forced from said vehicle tank during the filling operation will be retained in said closed fuel system.

3,903,943

LOG CUTTING AND REJOINING PROCESS

Earl Dean Hasenwinkle, Longview, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.

Filed Apr. 15, 1974, Ser. No. 461,075

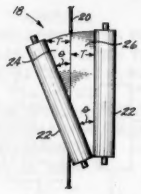
Int. Cl.[2] B27D *1/00*

U.S. Cl. 144—315 R **11 Claims**

1. The process for making solid and composite lumber products from generally cylindrical logs comprising the steps of:

longitudinally cutting the logs along radial cutting planes into a plurality of first pieces that are generally sector-shaped in cross section and with the resulting angle between radial faces being less than 90°,

cutting the first pieces along at least one longitudinal plane of cut that is substantially parallel to one of their radial faces thereby forming at least second pieces that are



generally trapezoidal in cross section and third pieces that are sector-shaped in cross section, smaller in size than the first pieces, and having the resulting angle between radial faces less than 90°, and

accumulating any two of the smaller sector-shaped pieces that are substantially equal in size and bonding them together along radial faces such that the thin edge of one is approximately adjacent the thick edge of the other.

3,903,944

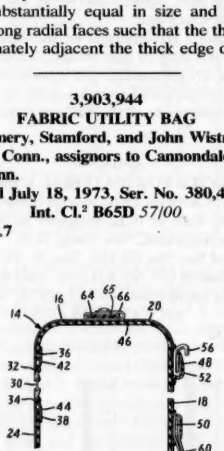
FABRIC UTILITY BAG

Joseph Montgomery, Stamford, and John Wistrand, New Canaan, both of Conn., assignors to Cannondale Corporation, Stamford, Conn.

Filed July 18, 1973, Ser. No. 380,458

Int. Cl.[2] B65D *57/00*

U.S. Cl. 150—2.7 **7 Claims**



1. A utility bag comprising

an outer enclosure of flexible, light-weight material having a top, a bottom, left and right sides and front and back walls defining an enclosed volume;

a continuous strip of initially substantially flat semi-flexible, substantially resilient and compressible polymeric foam material received within the outer enclosure and substantially coextensive with and in engagement with at least three adjacent ones of said walls, the foam material having a resiliency measured in accordance with ASTM D1056 of about 35 percent and a compression set measured in accordance with ASTM D1056 as follows: after 24 hours at room temperature,

at 50 percent compression, recovery to about 20 percent of compression amount

at 25 percent compression, recovery to about 8 percent of compression amount

at 10 percent compression, substantially full recovery; and

means associated with the outer enclosure for retaining respective opposite ends of the strip at predetermined

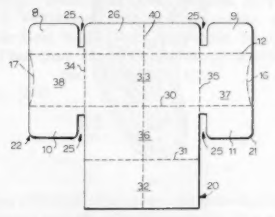
positions in the outer enclosure, the distance measured along the outer enclosure between said positions in the outer enclosure being substantially equal to the dimension of the strip between said opposite ends thereof and the retaining means constraining the strip under pressure outwardly against said adjacent ones of said walls to hold them extended and shaped.

3,903,945

STITCHLESS WALLET MADE FROM A SINGLE PIECE

Stanley A. Skeba, c/o U.S. Soldiers Home, Sheridan Bldg. No. 4210, Washington, D.C. 20317

Filed May 22, 1974, Ser. No. 472,342
Int. Cl.² A45C 1/06
U.S. Cl. 150—38 **4 Claims**



1. A wallet constructed from a single piece of material having a substantially T-shaped flap sheet pattern with a central main body section and two opposite arms extending from opposite sides thereof, the wallet comprising said sheet interfolded along a first pair of fold lines a each of which foldably connects said body section to one of said arms, said body section comprising, (1) an end flap, (2) an intermediate panel and (3) an outer wallet panel intermediate said arms, a second pair of fold lines extending through said arms and said body section and extending on opposite sides of said outer wallet panel, said second pair of fold lines defining on each arm a pair of opposed interlocking flap members, said two panels and said end flap being in folded relationship with each other with said intermediate panel positioned between said wallet panel and said end flap, said two panels and said flap forming two currency holding pockets which face in opposite directions and are located respectively on opposite sides of said intermediate panel, each of said arms overlying substantially half of said end flap and forming a slide pocket therebetween, each of said arms being connected to said outer wallet panel by a fold line therebetween, each of said interlocking flap members on each arm being positioned in its respective currency holding pocket.

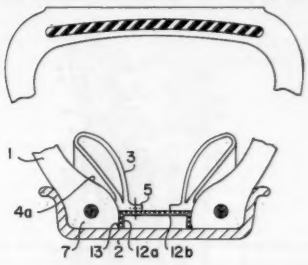
3,903,946

PNEUMATIC TIRE AND WHEEL ASSEMBLIES

Tom French, Sutton Coldfield, and Erwin Herbert Erhard Martin, Coventry, both of England, assignors to Dunlop Limited, England

Filed Mar. 9, 1973, Ser. No. 339,844
Claims priority, application United Kingdom, Mar. 11, 1972, 11510/72
Int. Cl.² B60C 17/00, 15/00
U.S. Cl. 152—330 L **16 Claims**

1. A pneumatic tire comprising a tread portion, a pair of sidewalls each terminating in an annular bead portion and a closed annular pocket containing a lubricant for the interior surfaces of the tire located on or adjacent the interior surface of at least one lower sidewall region of said tire, at least one portion of a wall of the pocket extending substantially radially of the pocket being constructed to be under greater stress than the remaining portions when the pocket is filled with a lubricant and located in the tire, said greater stressed portion being located nearest to the interior surface of the tire whereby the pocket is urged towards the interior surface of the tire against



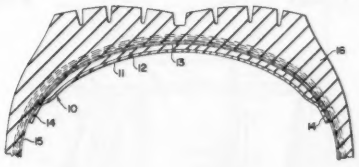
counteracting centrifugal forces which tend to urge the pocket away from the interior surface during use of the tire mounted on a wheel.

3,903,947

PUNCTURE SEALING MEANS FOR PNEUMATIC TIRES

Roy J. Emerson, Tallmadge, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 357,026, May 3, 1973, abandoned. This application Sept. 19, 1974, Ser. No. 507,502
Int. Cl.² B60C 21/08
U.S. Cl. 152—347 **33 Claims**



1. In a laminated puncture sealing strip for pneumatic tires, comprising one or more sealing composition layers of soft, sticky synthetic rubber encapsulated between separating and covering sheets of a vulcanized rubber compound, the improvement comprising employing in said sealing layers and in said separating and covering sheets different types of rubbers having solubility characteristics sufficiently different to allow the rubber used in said sealing composition to be softened with a plasticizer that does not substantially swell the rubber used in said separating and covering sheets.

3,903,948

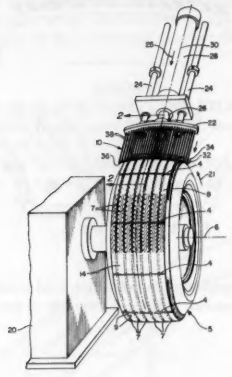
TRANSVERSE FLASH BREAKING IN TIRE MANUFACTURE

Christopher E. Christie, Akron; Paul E. Appleby, Cuyahoga Falls, and Frank R. Tully, Hudson, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 387,882, Aug. 13, 1973, Pat. No. 3,856,070. This application Sept. 27, 1974, Ser. No. 509,770
Int. Cl.² B29H 21/00
U.S. Cl. 157—13 **4 Claims**

1. The method of treating a tire having mold flash extending transversely of a circumferentially endless tread groove

therein, comprising inserting a flash tearing instrument into said groove, effecting relative movement between said tire and said instrument in a direction parallel to said groove to cause said instrument to penetrate and to tear said flash.

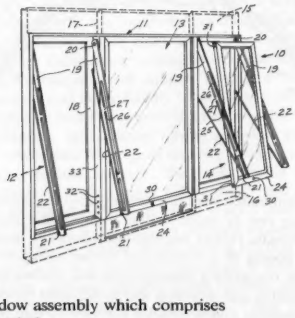


3,903,949

WINDOW

Gordon R. Aris, Akron, Ohio, assignor to Max G. Boardman and Patricia G. Cayia, both of Akron, Ohio

Filed July 25, 1973, Ser. No. 382,445
Int. Cl.[2] E05D *15/22, 15/44*
U.S. Cl. 160—93 **8 Claims**



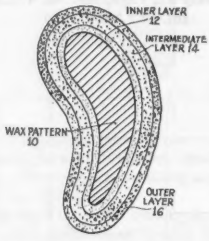
1. A window assembly which comprises
a framed window,
a casement having an opening receiving the window,
a pair of slide-bar brackets pivotally connected at one end to the casement on opposite sides of the window to pivot into and out of the casement opening, each bracket having an elongated slot extending along at least a portion of the length thereof,
pin means extending from about midpoint on opposite sides of the window each slidably received into a respective slot of a respective bracket to slidably and pivotally position the window with respect to the brackets,
a pair of struts each having one end pivotally connected to a respective bracket, and the other end adjustably positionable with respect to the casement to support said brackets in a pivoted relationship out of the opening of the casement,
means to move the window and pin means from the brackets, and
means to lock the window and brackets to the casement with the window positioned into the opening in the casement.

3,903,950

SANDWICH STRUCTURE MOLD

Nicholas G. Lirones, North Muskegon, Mich., assignor to Howmet Corporation, Greenwich, Conn.

Filed Dec. 26, 1973, Ser. No. 427,732
Int. Cl.[2] B22C *1/08, 1/10*
U.S. Cl. 164—26 **16 Claims**



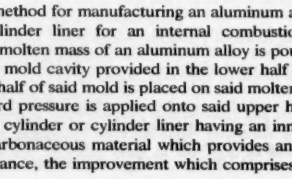
8. A sandwich structure recyclable mold for precision casting having a wall structure in cross-section comprising:
a. a homogenous relatively thin inner layer consisting essentially of finely divided refractory material, including a high strength inorganic binder which is chemically inert to metals to be molded and granular refractory stucco;
b. an intermediate layer consisting essentially of finely divided refractory material, refractory stucco and an organic fugitive binder;
c. an outer layer identical in composition to said inner layer.

3,903,951

METHOD OF MANUFACTURING ALUMINUM ALLOY CYLINDERS AND CYLINDER LINERS FOR INTERNAL COMBUSTION ENGINES

Yasuhisa Kaneko, Toyota; Yoshiro Komiyama, Okazaki; Yoshiki Uchiyama, Toyota; Hideki Murakami, Toyota, and Shiro Maeda, Toyota, all of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Continuation-in-part of Ser. No. 268,071, June 30, 1972, abandoned. This application Feb. 1, 1974, Ser. No. 438,695
Claims priority, application Japan, Jan. 14, 1972, 47-6420
Int. Cl. B22d *19/00, 27/12*
U.S. Cl. 164—97 **6 Claims**



1. In a method for manufacturing an aluminum alloy cylinder or cylinder liner for an internal combustion engine, wherein a molten mass of an aluminum alloy is poured into a cylindrical mold cavity provided in the lower half of a mold, the upper half of said mold is placed on said molten mass and a downward pressure is applied onto said upper half of said mold, said cylinder or cylinder liner having an inner surface layer of carbonaceous material which provides an increased wear resistance, the improvement which comprises:

placing a cylindrical reticulated basket of a desired diameter around a cylinder core in a coaxial relation therewith to define a hollow cylindrical space of a desired diameter between said core and said basket;

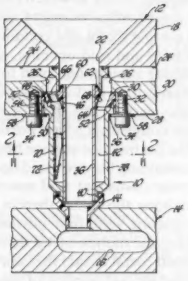
supplying said carbonaceous material into said hollow cylindrical space; and

placing said core and said basket together in said lower half of said mold in a coaxial relation therewith to define said mold cavity between said basket and said lower half of said mold, said molten mass being poured into said mold cavity and flowing into said basket, whereby said carbonaceous material is embedded in said molten mass to form said inner surface layer having a desired thickness.

3,903,952
BLOW TUBE ASSEMBLY

Robert E. Bego, Bloomfield Hills; William J. Thomas, and Anthony J. Voltattorni, both of Birmingham, all of Mich., assignors to Lear Siegler, Inc., Southfield, Mich.

Filed June 22, 1973, Ser. No. 372,809
Int. Cl.[2] B22C *15/24*
U.S. Cl. 164—200 **21 Claims**



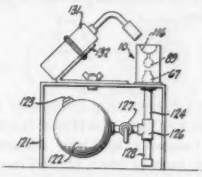
14. A blow tube assembly for use with a core-forming blow plate, said assembly comprising; a central tubular member, an outer jacket member surrounding said central tubular member, said central tubular member defining a straight passageway open at both the top and bottom ends thereof, said jacket member being secured to said central tubular member about the open bottom end of said central tubular member, said jacket member being spaced from said central tubular member from said bottom end to the top to define an annular opening at the top of said assembly between said members and to define a fluid circulating space between said members, a tube extending downwardly into said fluid circulating space from said annular opening, said tube being flexible and in frictional engagement with said central tubular member and said jacket so as to be readily removable from said fluid circulating space.

3,903,953
INVESTMENT CASTING APPARATUS ON FRAMEWORK

Billy C. Hudson, 948 Coronado Way, Livermore, Calif. 94550

Continuation-in-part of Ser. No. 878,111, Nov. 19, 1969, Pat. No. 3,698,468. This application Oct. 10, 1972, Ser. No. 296,291. The portion of the term of this patent subsequent to Oct. 17, 1989, has been disclaimed.
Int. Cl. B22d *27/16*
U.S. Cl. 164—255 **10 Claims**

1. In casting apparatus, a mold comprising a body of investment material defining a mold cavity, a framework including a horizontally extending platform for supporting the mold in an upright position, tank means for heating water and condensing steam to form a vacuum, means mounting the tank means in a predetermined position beneath the platform and forming a vacuum passageway between the tank means and the mold cavity, a mandrel member carried by the framework and extending a substantial distance into the investment material, said mandrel member having a passageway communicating with the vacuum passageway, one end of the mandrel

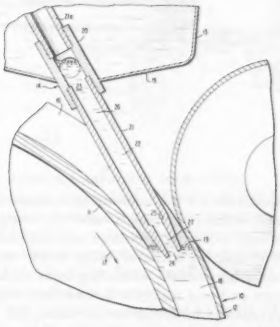


passageway being in close proximity to the mold cavity, and valve means movable between open and closed positions for controlling communication between the tank means and the mold cavity.

3,903,954
APPARATUS FOR POURING MOLTEN METAL

Billy Joe Richardson, Carrollton, Ga., assignor to Southwire Company, Carrollton, Ga.

Continuation of Ser. No. 176,685, Aug. 31, 1971, abandoned, which is a continuation of Ser. No. 809,241, March 21, 1969, abandoned. This application May 18, 1973, Ser. No. 361,611
Int. Cl.[2] B22D *11/10*
U.S. Cl. 164—278 **9 Claims**



1. In a continuous casting system comprising a rotatable casting wheel defining a peripheral groove, an endless band covering a portion of the peripheral groove to form an arcuate mold, and pouring means for pouring molten metal into the arcuate mold, the improvement in said pouring means including a pouring vessel positioned beside said casting wheel at one end of said arcuate mold and defining a molten metal outlet opening, a generally T-shaped connecting pipe having its base leg communicating with the outlet opening of said pouring vessel and extending laterally from said pouring vessel over said arcuate mold, an open ended pouring spout having an inlet opening at one end and an outlet opening at the other end and connected at its inlet opening to said connecting pipe and extending in a downwardly inclined direction toward said arcuate mold, a vent tube connected to said connecting pipe and extending generally in alignment with said pouring spout in an upward direction away from said pouring spout, said spout defining a rectilinear passage having a first section of substantially constant cross-sectional area extending from said inlet opening along a major portion of its length and a second section having an average cross-sectional area less than the cross-sectional area of said first section, said spout extending

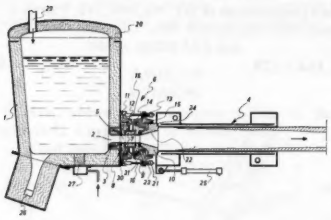
into said arcuate mold such that it will be submerged in the molten metal in the mold during the casting operation a distance sufficient for the entire surface of said second section to be maintained in contact with the molten metal, said submergence establishing a liquid seal, said liquid seal preventing the displacement of any air from said passage to said mold during the casting operation.

3,903,955

HORIZONTAL CONTINUOUS CASTING APPARATUS WITH RECIPROCATORY GATE

Jacques Antoine, Longeville-les-Metz; Robert Alberny, and Jacques Michelet, both of Metz, all of France, assignors to Institut de Recherches de la Siderurgie Francaise (IRSID), St. Germain-en-Laye, France

Filed Oct. 26, 1973, Ser. No. 410,293
Claims priority, application France, Nov. 6, 1972, 72.39113
Int. Cl. B22d *11/10*
U.S. Cl. 164—281 2 Claims



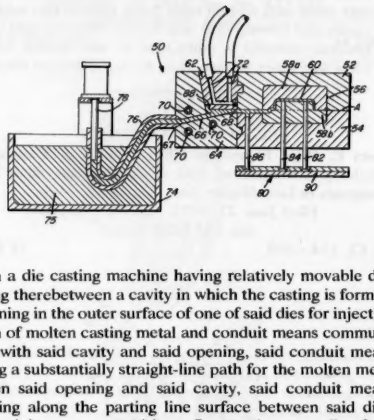
1. In an apparatus for the continuous horizontal casting of a molten metal, which comprises a vessel receiving the molten metal, the vessel including a bottom and side wall, and the vessel side wall defining a lateral orifice in the vicinity of the vessel bottom, a horizontally extending ingot mold having an open upstream end and an open downstream end whence a cast metal product is removed, and a means for passing the molten metal from the lateral orifice into the open upstream end of the ingot mold, the means comprising a connecting conduit between the lateral orifice and the open upstream end of the ingot mold, and a movable closing gate defining an orifice mounted in the connecting conduit for cutting off passage of the molten metal from the lateral orifice to the ingot mold: the combination of two plates wherebetween the gate is held for reciprocating displacement in a direction substantially perpendicular to the axis of the lateral orifice, the orifice in the gate having an axis substantially perpendicular to said direction and each of the plates having a central orifice coaxial with the lateral orifice, one of the plates being affixed to the side wall of the vessel, with the central orifice thereof in alignment with the lateral orifice, the other one of the plates being mounted for axial gliding movement in respect to the one fixed plate, the other plate having a first bearing surface for centering the other plate in respect of the one plate during the gliding movement, and a nozzle mounted between the other plate and the upstream end of the ingot mold, the other plate having a second bearing surface for centering the nozzle in respect of the other plate, the nozzle having an axial orifice flaring outwardly from the central orifice in the other plate to the open upstream end of the ingot mold.

3,903,956

DIE CASTING MACHINE WITH PARTING LINE FEED

George G. Pekrol, 185 Diamond Spring Rd., Denville, N.J. 07834

Filed Sept. 5, 1973, Ser. No. 394,453
Int. Cl.[2] B22D *17/04*
U.S. Cl. 164—316 5 Claims



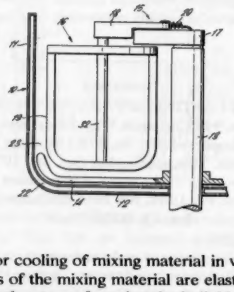
1. In a die casting machine having relatively movable dies defining therebetween a cavity in which the casting is formed, an opening in the outer surface of one of said dies for injection therein of molten casting metal and conduit means communicating with said cavity and said opening, said conduit means forming a substantially straight-line path for the molten metal between said opening and said cavity, said conduit means extending along the parting line surface between said dies, said conduit means comprising a first portion extending from said cavity along the parting line surface between said dies and a second portion extending between said opening and said first portion heating means adjacent said second portion of said conduit for maintaining the metal therein in a molten state, cooling means adjacent said first portion of said conduit means for solidifying the molten metal therein, and means for bending the solidified metal in said first portion away from the molten metal in said second portion of said conduit means.

3,903,957

PROCESS FOR COOLING GRANULAR MATERIALS BEING MIXED

Horst Bremer, Mergelweg, Germany, assignor to Gunther Papenmeier KG Maschinen- un Apparatebau, Detmold, Germany

Filed Jan. 12, 1973, Ser. No. 323,079
Claims priority, application Germany, Jan. 19, 1972, 2202455
Int. Cl.[2] B44F *1/00*; D01B *1/50*
U.S. Cl. 165—1 3 Claims



1. Process for cooling of mixing material in which the individual particles of the mixing material are elastically deformable, including the steps of moving the individual particles of the mixing material on effectively closed paths and at the same time gliding the particles past cooled surfaces and periodically subjecting at least parts of the quantities of the moved mixing material to an additional cooling by means of cooled surfaces,

the particles of said parts of the quantities of the moved mixing material being compacted under light flattening for a short time during the additional cooling process, whereby the heat contact areas of said particles are enlarged, said particles being loosened up by a loosening member during a relaxation period which follows the compaction period.

3,903,958

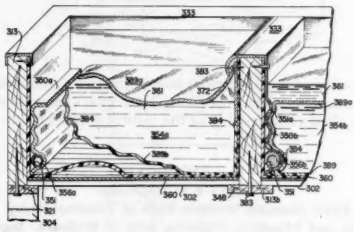
PROCESS AND APPARATUS FOR MODULATING TEMPERATURES WITHIN ENCLOSURES

Harold R. Hay, 2424 Wilshire Blvd., Los Angeles, Calif. 90057

Continuation-in-part of Ser. No. 668,202, June 26, 1957, abandoned, and Ser. No. 163,381, Dec. 19, 1961, abandoned, and Ser. No. 482,027, Aug. 16, 1963, Pat. No. 3,299,589, and Ser. No. 610,597, Jan. 20, 1967, Pat. No. 3,450,192, and Ser. No. 815,785, April 14, 1969, Pat. No. 3,563,305. This application Feb. 17, 1971, Ser. No. 114,977

Int. Cl. F24f *3/00*

U.S. Cl. 165—2 **18 Claims**



1. The method for indirect cooling of an at least partially enclosed room by means of evaporating a liquid from a horizontally disposed reservoir confined in at least one plenum formed at least in part by a horizontally disposed structural portion of said room, wherein the steps are:

a. Transferring heat from air contacting said structural portion of said room through said structural portion and into said liquid,

b. Causing flow of air unsaturated with said liquid through said plenum,

c. Evaporating some of said liquid into said flowing air thereby cooling said liquid and causing said flowing air to be more nearly saturated,

d. Transferring heat from said flowing air into said liquid thereby at least partially cooling said air,

e. Causing said cooled air to discharge from said plenum.

3,903,959

GAS TURBINE ENGINE HEAT REGENERATOR

Shingi Fushimi, Yokosuka; Katsuhiro Kishida, and Hiroyuki Aoki, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

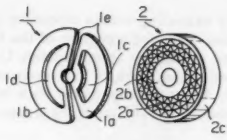
Filed Aug. 14, 1973, Ser. No. 388,173

Claims priority, application Japan, Aug. 15, 1972, 47-81635

Int. Cl. F28d *19/00*

U.S. Cl. 165—9 **5 Claims**

1. A disc type rotary heat regenerator for a gas turbine engine having a housing and comprising a seal member fixed in said housing, a first porous layer formed on a surface of said member and having a porosity of 20% to 30% by volume, said first porous layer being formed of a mixture of powders, comprising a first material selected from the group consisting of nickel oxide and cobalt oxide, and a second material selected from the group consisting of alkaline-earth metal fluoride, phosphate and borate, a matrix member rotatably mounted in said housing, a second porous layer formed on a surface of said matrix member, said matrix member being rotatable relative to said seal member with said first and second porous layers in abutting contact with each other, and a heat resisting lubricant, at least said first porous layer being impregnated with said heat resisting lubricant, said heat resisting lubricant



being selected from the group consisting of graphite, molybdenum disulphide, tungsten disulphide, boron nitride and sericite.

3,903,960

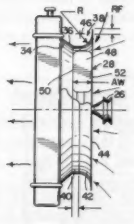
FAN SHROUD ENTRANCE STRUCTURE

Harold D. Beck, Downers Grove, and Walter H. Page, Elmhurst, both of Ill., assignors to International Harvester Company, Chicago, Ill.

Filed Dec. 26, 1973, Ser. No. 428,547

Int. Cl.² F01P *11/10*

U.S. Cl. 165—51 **5 Claims**



1. A heat exchange apparatus comprising:

a heat exchange means having front and rear faces;

a shroud means having a forward section arranged to encircle said rear face, and a rearwardly extending cylindrical contoured entrance section means including in successive sections a cylindrical throat section, a radial curved section and a radial flat portion;

a blower fan assembly including a plurality of fan blades, each of said fan blades having a leading edge and a trailing edge, said trailing edges lying substantially in a radial plane containing the juncture of said forward section and said contoured entrance section, and said leading edges lying substantially in a radial plane containing said radial flat portion wherein the following relationship exists: $RF=AW/3$, $CF=AW/3$, and $R=2AW/3$ where RF is the length of the radial flat portion, CF is the length of the cylindrical throat section, R is the radius of curvature of the radial curved section and AW is the projected axial width of the fan blades.

3,903,961

HOT OIL DRUM

Peter Stanislaw, Stockholm, N.J., assignor to Morrison Machine Co., Paterson, N.J.

Filed Nov. 8, 1973, Ser. No. 413,794

Int. Cl.² F28F *13/06*

U.S. Cl. 165—89 **41 Claims**

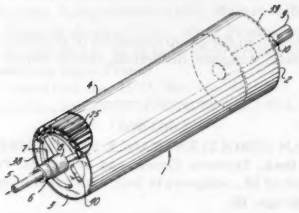
1. Apparatus for uniformly heating materials, said apparatus comprising:

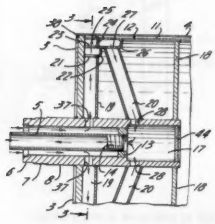
a. concentric inner and outer shells defining an annular flow space therebetween;

b. closing means connecting the opposite ends of said inner and outer shells;

c. longitudinally extending partitions extending between said inner and outer shells and forming a plurality of longitudinally extending compartments within said flow space;

d. longitudinally extending baffles extending between said inner and outer shells for a portion of the length of said compartments, so that an approximately U-shaped flow path is formed within each of said compartments, said approximately U-shaped flow paths each including only two legs consisting of an entrance leg and an exit leg, said





legs being circumferentially arranged with respect to each other;

e. feed means for supplying a heat-transfer fluid to said entrance leg of each of said approximately U-shaped flow paths;

f. return means for withdrawing a heat-transfer fluid from said exit leg of each of said approximately U-shaped flow paths.

2. The apparatus of claim **1** including a centrally disposed concentric feed passage adapted to be connected to a source of heat-transfer fluid, said central feed passage communicating with said feed means and said return means.

3,903,962

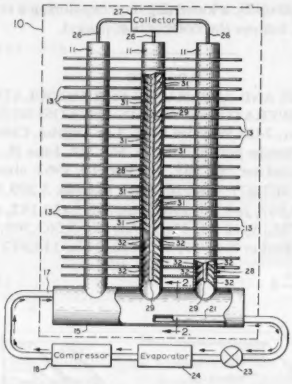
CONDENSATE GUIDING APPARATUS FOR VERTICAL CONDENSING TUBES OF VAPOR CONDENSER

Alwin B. Newton, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed June 26, 1974, Ser. No. 483,195
Int. Cl. F28b *9/08*
U.S. Cl. 165—110 **4 Claims**

1. In a vapor condenser of the type having at least one air-cooled, generally vertical condensing tube through which refrigerant vapor to be condensed flows and forms condensate on the tube's internal surface, apparatus for guiding the condensate within the condensing tube comprising:

means for removing condensate from an upper portion of the tube's internal surface to improve the heat transfer characteristic of the condensing tube and to enhance condensation;



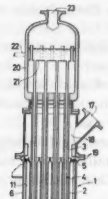
and means for returning at least some of the removed condensate to a lower portion of the tube's internal surface to obtain sub-cooling of the returned condensate.

3,903,963

HEAT EXCHANGER

Ichiro Fuki; Shosaku Shimizu, both of Tamano; Etsuji Yamamoto, and Masahiko Yoshida, both of Ichihara, Japan, assignors to Mitsui Shipbuilding and Engineering Co., Ltd. and Mitsui Petrochemical Industries Ltd., both of Tokyo, Japan

Filed Mar. 1, 1974, Ser. No. 447,206
Claims priority, application Japan, Mar. 6, 1973, 48-26412
Int. Cl.[2] F28F *9/00;* **F28D** *7/12*
U.S. Cl. 165—142 **2 Claims**



1. A heat exchanger, comprising:

a drum having a heating fluid inlet and a heating fluid outlet;

a plurality of heating fluid passing tubes disposed parallel to each other in said drum between said heating fluid inlet and said heating fluid outlet, each of said heating fluid passing tubes being open at both ends;

at least one heat transfer tube in each of said heating fluid passing tubes, that end of each of said heat transfer tubes positioned nearer said heating fluid inlet being closed;

at least one inner tube disposed in each of said heat transfer tubes and open at the end thereof nearer said closed end of said heat transfer tube in which it is disposed;

means for flowing a liquid through said inner tubes and heat transfer tubes; and

tube mounting means for mounting said tubes to said drum; said mounting means fixedly securing said heat transfer

tubes, said heating fluid passing tubes and said inner tubes to said drum at the ends thereof which are more remote from said heating fluid inlet, while leaving the ends of each of said tubes nearer said heating fluid inlet free to expand and contract with respect to said drum in response to temperature changes.

3,903,964

HEAT EXCHANGER FOR COOLING HOT GASES

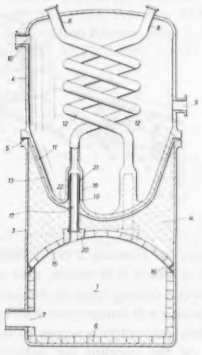
Petrus J. J. Van Doorn; Antonius J. J. Van Gestel, and Peter J. Deen, all of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed May 1, 1974, Ser. No. 465,974

Claims priority, application United Kingdom, May 15, 1973, 22971/73

Int. Cl.² F28F *13/00*

U.S. Cl. 165—158 **15 Claims**



1. A heat exchanger for cooling hot gases which comprises

a. A gas inlet chamber provided with at least one gas inlet;

b. A cooling chamber provided with at least one gas outlet;

c. A gas inlet plate disposed between said gas inlet chamber and said cooling chamber and forming a common wall with said chambers, the surface of said gas inlet plate exposed to said gas inlet chamber being provided with a refractory cladding;

d. At least one gas carrying tube having one end connected to and projecting through said gas inlet plate to allow fluid communication with said gas inlet chamber and having the other end extend through said cooling chamber to form the aforesaid gas outlet for said cooling chamber, the initial length of the inner surface of the end of the gas carrying tube in fluid communication with the gas inlet chamber being provided with a refractory lining, and

e. At least one pipe interconnected with said cooling chamber for coolant supply and discharge from the cooling chamber.

3,903,965

APPARATUS FOR INSTALLING AND SETTING PACKING ASSEMBLIES IN WELLHEADS

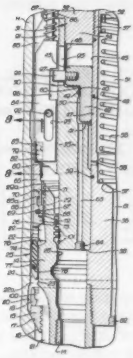
Arthur G. Ahlstone, Ventura, Calif., assignor to Vetco Offshore Industries, Inc., Ventura, Calif.

Filed Mar. 7, 1974, Ser. No. 449,193

Int. Cl.² E21B *23/00, 43/10*

U.S. Cl. 166—182 **34 Claims**

1. Apparatus for effecting a seal between a wellhead and a hanger disposed therein for supporting a tubular string extending into a well bore: comprising a running tool having a body structure and connectible to a running string; packing means; means releasably connecting said packing means to said body structure to enable said packing means to be placed in sealing relation to the hanger; actuatable means movable on said body



structure for preventing release of said connecting means; and shifting means for moving said actuatable means on said body structure to a position permitting release of said connecting means.

3,903,966

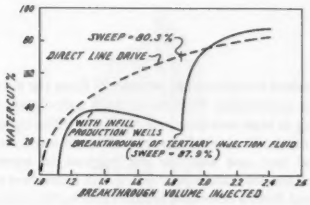
TERTIARY RECOVERY OPERATION

Thomas S. Teasdale, Houston, Tex., and Anthony Francis Altamira, Dhahran, Saudi Arabia, assignors to Texaco Inc., New York, N.Y.

Filed Oct. 17, 1973, Ser. No. 407,113

Int. Cl.² E21B *43/20*

U.S. Cl. 166—245 **1 Claim**



1. In a method of recovering petroleum from a subterranean petroleum containing formation penetrated by at least two groups of three wells each, each group comprising two original production wells and an original aligned injection well therebetween, the groups being arranged in a direct line drive pattern, the petroleum recovery method being of the type wherein water is injected into the original injection wells to displace petroleum toward the adjacent original production wells from which petroleum is recovered until the injected water breaks through at the original production wells, wherein the improvement for recovering additional petroleum from the formation comprises:

a. penetrating the formation with at least two additional production wells, each well located between an original injection well of one group of wells and an adjacent original production well of an adjacent group of wells;

b. shutting in the original injection wells;

c. converting the original production wells to new injection wells; and

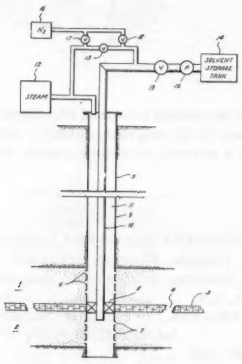
d. injecting water into the new injection wells and recovering petroleum from the new production wells.

3,903,967

METHOD FOR RECOVERING VISCOUS PETROLEUM

Charles D. Woodward, Houston, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Sept. 23, 1974, Ser. No. 508,029
Int. Cl.[2] E21B *43/16*
U.S. Cl. 166—269 11 Claims



1. A method of recovering petroleum from the subterranean petroleum containing formation, said petroleum formation comprising at least two intervals of widely differing permeabilities, the method being of the type wherein a recovery fluid is introduced into one well for the purpose of increasing the mobility of the formation petroleum and formation petroleum is recovered from a remotely located production well, wherein the improvement for increasing the vertical conformance comprises:

a. establishing a separate communication path between the surface of the earth and at least two zones of the subterranean formation whose permeabilities differs from one another;

b. introducing the recovery fluid into the more permeable zone until the pressure has been increased in that zone to a value greater than the original formation pressure;

c. introducing a solvent selected from the group consisting of hydrocarbons having from 1 to 10 carbon atoms, carbon dioxide and mixtures thereof into the zone of lower permeability;

d. thereafter introducing the recovery fluid into the lower permeability zone to displace the solvent away from the injection well, originally maintaining the injection pressure into the lower permeability zone at a value less than the injection pressure of the drive fluid being introduced into the zone of greater permeability; and

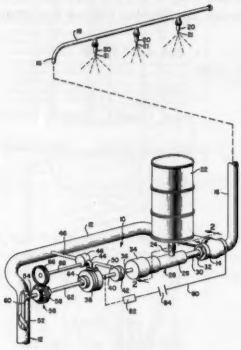
e. recovering petroleum from the remotely located well.

3,903,968

MIXING APPARATUS

William L. Livingston, Sharon, Mass., assignor to Factory Mutual Research Corporation, Norwood, Mass.

Division of Ser. No. 360,963, May 16, 1973, Pat. No. 3,831,617, which is a continuation of Ser. No. 194,994, Nov. 2, 1971, abandoned, which is a division of Ser. No. 864,757, Oct. 8, 1969, Pat. No. 3,642,072. This application Mar. 13, 1974, Ser. No. 450,759
Int. Cl.[2] A62C *35/44*
U.S. Cl. 169—14 7 Claims



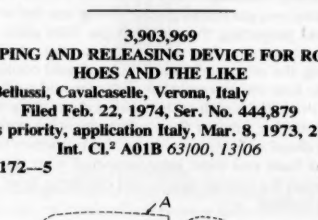
1. An apparatus for forming a composition at least one of the components of which is flowable, said apparatus comprising means defining a mixing area for said components, a conduit associated with each component for delivering said components from their respective sources to said mixing area, at least a portion of the conduit for delivering said flowable component enclosing at least a portion of the conduit for delivering another component to define an annular flow channel for said flowable component between said conduits, and an annular member extending in a portion of said annular flow channel in a manner to interfere with the flow of said flowable component through said flow channel to impart a turbulence to said flowable component, said annular member being adapted to vary said interference in response to changes in the flow rate of said flowable component.

3,903,969

CLAMPING AND RELEASING DEVICE FOR ROTARY HOES AND THE LIKE

Angelo Bellussi, Cavalcaselle, Verona, Italy

Filed Feb. 22, 1974, Ser. No. 444,879
Claims priority, application Italy, Mar. 8, 1973, 21324/73
Int. Cl.[2] A01B *63/00*, *13/06*
U.S. Cl. 172—5 9 Claims



1. In a machine for working the soil, drive means for driving soil-working tools, frame means carrying said drive means,

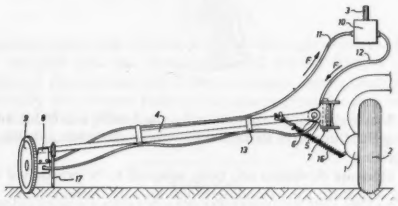
support means supporting said frame means for swinging movement with respect to said support means in response to a reaction between driven tools and the soil worked thereby, latch means carried by said support means and having a latching position cooperating with said frame means for preventing swinging thereof with respect to said support means, latch-release means operatively connected with said drive means to be driven thereby, said cam means acting on said latch-release means when the latter is an operating range of said cam means for displacing said latch means to a release position releasing said frame means for swinging movement with respect to said support means for avoiding a collision with an obstacle, and positioning means operatively connected with said latch-release means for positioning the latter in the operating range of said cam means prior to collision with the obstacle.

3,903,970

WORKING AREA MARKING MECHANISM FOR AGRICULTURAL MACHINES

Xavier Roger Grataloup, Montereau, France, assignor to Societe Anonyme: Nodet Gougis, Montereau, France

Filed Apr. 26, 1974, Ser. No. 464,460
Claims priority, application France, May 2, 1973, 73.15753
Int. Cl.² A01B *17/00, 65/02*
U.S. Cl. 172—126 **2 Claims**



1. In a marking mechanism for marking limits of the working area of an agricultural machine having a frame, a support arm, means for pivotally mounting one end of said support arm on the machine frame for pivotal generally horizontal movement, a hydraulic pump carried by said machine and driven concurrently with movement of the machine over an area to be marked, a hydraulic motor mounted on said support arm and being operatively connected to said marking member for rotating the latter, tubing connecting said pump to and from said motor, an adjustable control valve interposed in said tubing for varying the speed of rotation of said motor and said marking member, and means responsive to pivotal generally horizontal movement of said support arm for adjusting the opening of said control valve as a function of the generally horizontal movement of said support arm relative to said frame thereby to vary the speed of rotation of said hydraulic motor and said marking member.

3,903,971

APPARATUS FOR DRIVING DRAIN PIPES

Hikoitsu Watanabe, No. 5-13, 1-chome, Ebara-cho,, Nakanoku, Tokyo, Japan

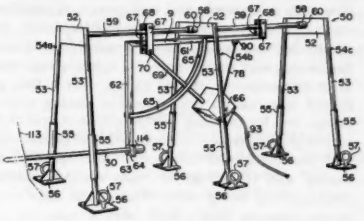
Division of Ser. No. 391,984, Aug. 27, 1973. This application June 10, 1974, Ser. No. 477,783
Claims priority, application Japan, June 27, 1973, 48-75530[U]; Feb. 12, 1973, 48-16526; Mar. 27, 1973, 48-34091; July 17, 1973, 48-79949; Aug. 29, 1972, 47-85883
Int. Cl.² E21C *3/08;* **E02D** *7/08*
U.S. Cl. 173—37 **9 Claims**

1. An apparatus for driving drain pipes and other elongated objects, comprising

a supporting frame;

a hammer mounted on said frame for pendulum movement relative thereto and having a head adapted to impact a trailing end of an object to be driven; and

drive means for imparting said pendulum movement to said hammer, comprising a pivot shaft turnably mounted on said frame, a drum freely turnably surrounding said pivot shaft, an elongated flexible element having one end fixed to said drum and another end fixed to said hammer, a first



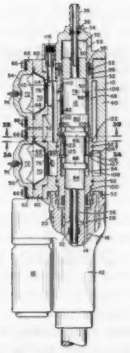
clutch section mounted on said drum for rotation therewith, a second clutch section mounted on said shaft for rotation with the same but with freedom of axial movement relative to said shaft, motor means for rotating said shaft, and control means for intermittently moving said second clutch section into motion-transmitting engagement with said first clutch section so that said drum rotates with said shaft for the duration of said motion-transmitting engagement.

3,903,972

IMPACT TOOLS

John V. Bouyoucos, Brighton, and Roger L. Selsam, Perinton, both of N.Y., assignors to Hydroacoustics Inc., Rochester, N.Y.

Filed Apr. 24, 1974, Ser. No. 463,625
Int. Cl.² E21C *3/20;* **F01B** *23/06;* **B25D** *9/20*
U.S. Cl. 173—134 **11 Claims**



1. An impact tool for generating percussive forces, said tool comprising:

a housing have a bore,

a piston disposed for oscillatory movement in said bore over a forward stroke toward and over a return stroke away from an impact position during each cycle of oscillation of said piston,

said piston having faces which define the end boundaries of first and second variable column cavities in said bore, the

volumes of which vary in opposite senses when said piston moves in said bore,

the area of the one of said faces which defines said first cavity being greater than the area of the other of said faces which defines said second cavity,

means in said housing whereby pressurized fluid is supplied thereto and returned therefrom,

a valve mechanism associated with said first cavity having ports in said first cavity spaced from each other axially with respect to said bore and respectively in communication with said supply and said return of said last-named means, a valve element in said first cavity extending axially between said ports and movable with said piston for closing said supply port and opening said return port after displacement of said piston over a first predetermined distance in one direction during said forward stroke and for opening said supply port and closing said return port after displacement of said piston over a second predetermined distance in the opposite direction during said return stroke, said second predetermined displacement being substantially less than said return stroke whereby said return port is open for a shorter period of time than said supply port is open during each said cycle, and

means in said housing providing communication between said supply and said second cavity for applying forces to said other piston face to drive it in a direction away from said impact position when said valve element opens said return port and closes said supply port.

3,903,973

EXCAVATOR TOOL COMPRISING A SUPPORT, AN AUGER MOUNTED ROTATABLY

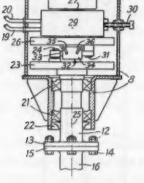
Pierre Jean Leyrat, Trilport, and Didier Albert Wolf, Meaux, both of France, assignors to Societe Anonyme: Poclain, Le Plessis Belleville, France

Filed Feb. 25, 1974, Ser. No. 445,263

Claims priority, application France, Mar. 12, 1973, 73.08723

Int. Cl.[2] E21B *3/02*

U.S. Cl. 173—163 **3 Claims**



1. An excavator tool comprising a support, an auger mounted rotatably with respect to the said support, a motor for driving the auger in rotation, linked between the support and the auger, and a vibration-generator interposed between the support and the auger which in operation generates a vibratory rotational motion coaxial with the main rotation of the auger, the generator comprising a fluid-operable ram having at least one working chamber, and means for placing the chamber alternately in communication with a source of fluid under pressure and with a discharge tank, the ram being linked between one of the relatively movable elements of the motor, the frame or the output shaft, which is movable with respect to the support, and the shaft of the auger, and eccentrically with respect to at least one of these parts comprising the movable element of the motor and the shaft of the auger.

3,903,974

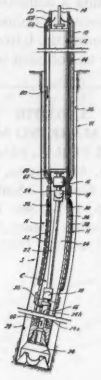
DRILLING ASSEMBLY, DEVIATION SUB THEREWITH, AND METHOD OF USING SAME

Roy H. Cullen, 500 Jefferson Bldg., Houston, Tex. 77002

Filed Mar. 12, 1974, Ser. No. 450,468

Int. Cl.[2] E21B *7/08*

U.S. Cl. 175—17 **23 Claims**



1. A deviation sub adapted to be used with a drill bit and drilling fluid in a drill string for downhole directional drilling, comprising:

an elongate deviation sub body adapted to be positioned in a well bore for extending longitudinally therein; and,

longitudinal deviation means forming a part of said body and extending longitudinally on said body for causing said body to deviate from a first longitudinal position to a second longitudinal position at an angle to said first longitudinal position, wherein said longitudinal deviation means includes temperature variation means for causing a temperature differential in opposing longitudinal portions of said deviation sub body having a longitudinal higher temperature portion opposing a longitudinal lower temperature portion of said deviation sub body.

3,903,975

DRILLING APPARATUS WITH DOWN-THE-HOLE MOTOR

Gerald T. Sweeney, Federal Way, Wash., assignor to Tigre Tierra, Inc., Puyallup, Wash.

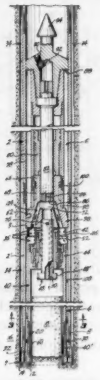
Division of Ser. No. 283,208, Aug. 23, 1972, Pat. No. 3,854,539. This application June 3, 1974, Ser. No. 475,594

Int. Cl.[2] E21B *5/00*

U.S. Cl. 175—246 **17 Claims**

1. In combination, a piston-like means having a hammer mechanism thereon, an elongated excavation means suspended from the piston-like means, a rotary drill rod comprising an elongated pipe having a longitudinally extending bore therethrough and an annular bit at the distal end thereof, the piston-like means being slidably received in the bore through the proximal end thereof and there being an annular shoulder about the periphery of the bore to receive blows from the hammer of the mechanism adjacent the bit, means defining an annular seat about the periphery of the bore between the shoulder and the mouth of the bit, which is of lesser inside diameter than that of the shoulder, the excavation means being slidably received in the distal end portion of the bore through the opening of the shoulder and having one end thereof engaged with the seat, fluid passage means in the rod

extending generally longitudinally of the bore between a point adjacent the shoulder and a point about the periphery of the seat, and porting in the body of the bit, extending generally axially thereof between the fluid passage means and the working face of the bit at the distal end thereof, together forming



a passage about the excavation means through which fluid can be released into the working face of the bit from a point adjacent the opposite end of the axcavation means, and means whereby the released fluid can discharge from the face of the bit toward the proximal end of the pipe on the opposite side of the pipe from the excavation means.

3,903,976

MECHANICAL SCALE AND METHOD OF CALIBRATING THE SAME

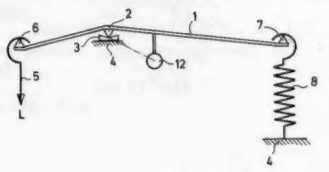
Martin Ziefle, Balingen, Wurttemberg, Germany, assignor to Bizerba-Werke Wilhelm Kraut KG, Balingen, Wurttemberg, Germany

Filed Oct. 4, 1973, Ser. No. 403,606

Claims priority, application Germany, Oct. 12, 1972, 2250008

Int. Cl.[2] G01G *23/14*

U.S. Cl. 177—164 **7 Claims**



1. In a gravity compensated spring scale, a combination comprising support means; a balance lever fulcrumed intermediate its ends on said support means and thereby forming a first arm located at one side of the fulcrum and adapted to be connected with a load to be weighed, and a second arm located at the other side of the fulcrum; a biasing spring connected to said other side of said fulcrum; a biasing spring connected to said other side of said fulcrum so as to counter the weight of said load, the force exerted by said biasing spring upon said lever being independent of gravity so that the scale will have indicating errors causing erroneous weight indications for said load at different geographic locations where the force of gravity acts with different magnitude upon the load but does not influence the spring force; means for compensating for gravity comprising a weighted member connected to said other side of said fulcrum and acting to pivotally displace said balance lever in a vertical weighing plane so that measuring errors will occur upon inclining said support means in said vertical weighing plane, and including inclining means for inclining said support means in said vertical weighing plane so that said measuring errors will compensate for said indicating errors of said scale; a level provided on said support means; and adjusting means for adjusting said level in said vertical plane with respect to said support means to a position in which said level indicates apparent horizontality of said support means even though said support means is inclined in said plane to the horizontal to compensate for gravity-caused balance errors.

3,903,977

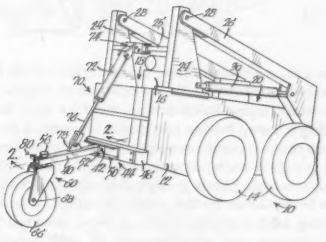
SKID STEER VEHICLE WITH CASTER WHEEL

Roy A. Gillette, and Charles D. Wilson, both of Burlington, Iowa, assignors to J. I. Case Company, Racine, Wis.

Filed July 1, 1974, Ser. No. 484,418

Int. Cl.[2] B62D *11/02*

U.S. Cl. 180—6.2 **2 Claims**



1. A skid-steer vehicle including an elongated body having a forward end and a rear end with a pair of driven wheels on each side of said body, a material handling unit on said body extending forwardly of said forward end; an elongated arm; pivot means on said rear end supporting said arm for vertical pivotal movement about a horizontal pivot with said arm extending rearwardly of said rear end and having an outer free end; a socket on said outer free end of said arm, said socket defining a socket opening having a substantially vertical axis; a wheel support having a pin portion rotatably supported in said socket opening for universal rotation with respect to the axis of said socket opening, said wheel support also having a latch opening therein; a caster wheel rotatably supported on said wheel support for rotation about a pivot axis normal to said axis of said opening, said pivot axis being laterally offset from said axis of said opening; means connected between said body and said arm for pivoting said arm between raised and lowered positions; and latch means connected between said arm and said wheel support for maintaining said pivot axis rearwardly of said axis of said opening to increase the spacing between the lower edge of said caster wheel with respect to adjacent supporting structure for said vehicle while said arm is in the raised position, said latch means including a generally U-shaped bracket fixed to said arm and having spaced generally parallel upper and lower legs, each of said legs having an opening therein and said openings in said legs being aligned with the latch opening in said wheel support, means defining a flange on the upper leg of said bracket, said flange being spaced from the opening in said upper leg and said flange having a recess therein, said latch means further including a generally L-shaped latch pin including first and second legs, the first leg of said latch pin having an axial dimension sufficient to extend through the openings in the legs of said bracket and through the latch opening in said wheel support when the second leg of the latch pin rests upon the upper leg of said bracket to thereby retain said arm in the raised position, the

lower end of the first leg of said latch pin being spaced from the latch opening in said wheel support when the second leg of the latch pin is positioned in the recess in the flange on the upper leg of said bracket, whereby said wheel support is free to pivot relative to said arm when said arm is in the lowered position.

3,903,978

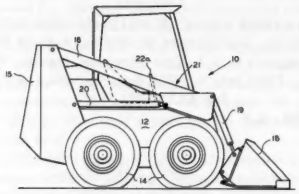
SKID-STEERED VEHICLE TRANSMISSION

Peter B. Kraus, Lisbon, N. Dak., assignor to Clark Equipment Company, Buchanan, Mich.

Filed Nov. 12, 1973, Ser. No. 415,182

Int. Cl.[2] B62D *11/04*

U.S. Cl. 180—6.48 **3 Claims**



1. In a four-wheeled drive, skid-steered vehicle having limited body space between the wheels and an engine in the rear, a hydrostatic transmission arrangement for such limited space including a pump having two pump sections, a porting block between the two pump sections having an axial bore, rotatable piston groups in each pump section, shaft means interconnecting the rotatable piston groups through said bore, said shaft means being driven by the engine, a source of hydraulic fluid supplying said rotatable piston groups, means for independently varying the displacement of said rotatable piston groups between the reversible suction and pressure areas on opposite sides of said shaft means, a pair of ports in each of the opposite faces of said porting block aligned with the suction and pressure areas of said piston groups, a pair of hydrostatic motors each having a rotatable piston group, means fixed in relationship to said independently variable means for displacing the piston groups of each motor in suction and pressure areas corresponding to the reversible suction and pressure areas of said pump piston groups and gear reduction means driven by said motors on opposite sides of the vehicle for driving said wheels, the improvement comprising a passage network in said porting block providing fluid communication from said pairs of ports to an exterior surface of the block at spaced locations including first passage means for each pair of ports that connects one port with said exterior surface by crossing from one side of the axis of rotation to the other, second passage means that connects the other part of each pair of ports with said exterior surface without crossing the axis of rotation and fluid filled conduits connecting said first and second passage means at each spaced location with the respective hydrostatic motor closest to said location.

3,903,979

HEAVY-DUTY MOTOR VEHICLES

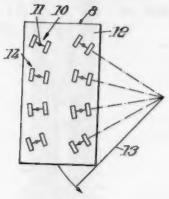
Jean Perrotin, Saint-Bris-Le-Vineux, France, assignor to Jean Nicolas & Fils, France

Filed May 17, 1974, Ser. No. 471,146

Int. Cl.[2] B62D *61/10*

U.S. Cl. 180—23 **10 Claims**

1. A steering mechanism for a self-propelled vehicle carried by a plurality of wheel rows, each including several wheel axles, said mechanism comprising a driver actuated main steering system for angular control of all said axles simultaneously for causing the vehicle to follow a rectilinear or circular path with all axles converging toward the center of the circular path; a locking mechanism associated with each of the axles for positively coupling all of the axles with the main steering system; means under the control of the driver for deactivating said locking mechanisms and uncoupling all said axles from said main steering system simultaneously; and an auxiliary steering system for angularly moving the axles to and



from a position for transverse movement of the vehicle when actuated, comprising power cylinders independent from the main driving system and operatively connected to said axles and which in deactivated condition release said axles and permit free angular control of the axles by the main steering system.

3,903,980

REMOVABLE ENGINE UNIT ARRANGEMENT FOR MOTORCYCLES

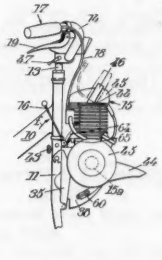
Jean Darras, Clamart, France, assignor to Societe Internationale de Vente pour l'Automobile et le Cycle, Courbevoie (Hauts-de-Seine), France

Filed Jan. 15, 1974, Ser. No. 433,477

Claims priority, application France, Feb. 21, 1973, 73.06164

Int. Cl. B62k *11/12*

U.S. Cl. 180—31 **10 Claims**

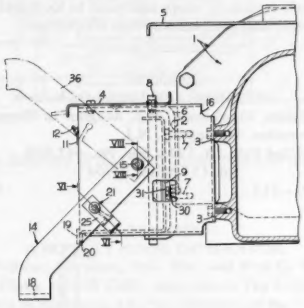


1. A bicycle having an engine unit provided with a roller for driving frictional engagement with the peripheral surface of a wheel of the bicycle, means for securing the engine to a fork carrying said wheel in a position such that the roller can be moved into engagement with said wheel, manually releasable means for locking the engine unit in its secured position on said fork, operator actuatable means for controlling the engine, and releasable means for securing said operator actuatable means to steering handlebars of said bicycle, said engine having means for receiving said operator actuable means, said releasable means being adapted to cooperate with both the handlebars to retain the operator actuable means in its operative position and with the receiving means to retain the operator actuable means in a position in which it can be used to handle the engine unit.

3,903,981
PIVOTAL STEP AND BATTERY MOUNT

Donald E. Peterson, Wauwatosa, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed June 5, 1974, Ser. No. 476,596
Int. Cl.² B60R *18/02, 3/00*
U.S. Cl. 180—68.5 **10 Claims**

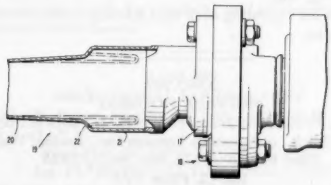


1. A pivotal battery mount on a tractor comprising, a tractor chassis, a horizontal step having step supporting structure defining a battery compartment under said step supported by said chassis, a battery tray, bracket means and pivotal tray supporting means defining a pivotal axis pivotally supporting said battery tray on said step supporting structure, a bracket structure forming an end wall, a pendent step pivotally mounted on said bracket structure of said step supporting structure, a retainer means on said pendent step for retaining said battery tray under said horizontal step, a latch for selectively latching said pendent step to said bracket structure while said retainer means on said pendent step holds said battery tray under said horizontal step.

3,903,982
DRIVE SHAFT FOR VEHICLES, ESPECIALLY FOR MOTOR VEHICLES

Friedrich H. Van Winsen, Kirchheim; Joachim H. Sorsche, Stuttgart, and Erwin Sommer, Esslingen-Waldenbronn, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Nov. 15, 1972, Ser. No. 306,875
Claims priority, application Germany, Nov. 16, 1971, 2156783
Int. Cl. B60k *17/22*
U.S. Cl. 180—70 R **5 Claims**

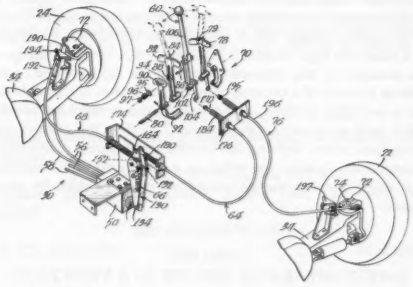


1. A drive shaft arrangement for vehicles, especially motor vehicles having a driving engine and an axial drive, the arrangement comprising: a drive shaft provided with joint means for operatively connecting the driving engine with the axle drive, and means for transmitting torque and dissipating axial impact energy of the drive shaft including at least one axial deformation means inserted into said drive shaft, said axial deformation means including at least two tubular sections of different diameter, said tubular sections being spaced from each other in an non-overlapping relationship along the axial direction of the drive shaft, and a connecting portion disposed approximately normal to the axis of the drive shaft and extending between adjacent end portions of said spaced tubular sections, said connecting portion serving for the deformation of a roller-bellows-like fold whereby upon application of an axial impact force on the drive shaft the axial impact energy is dissipated by one of said tubular sections telescoping into the other of said tubular sections.

3,903,983
STEERING SYSTEM FOR VEHICLES

Laurel R. Yeske, Burlington, Wis., assignor to J. I. Case Company, Racine, Wis.

Filed Dec. 29, 1972, Ser. No. 319,546
Int. Cl.² B62D *5/06, 7/16*
U.S. Cl. 180—79.2 C **12 Claims**



1. A steering system for a vehicle including front and rear wheels, comprising first means including a steering wheel for controlling the turning movement of said front wheels; second means for controlling the turning movement of said rear wheels, said second means including a valve having a valve spool movable in opposite directions from a neutral position to cause said rear wheels to turn, said spool having extreme operative positions; a link connected to said spool and pivot means for said link adjacent said spool; a lever; connecting means between said link and said lever for manually actuating said valve spool by said lever independent of said front wheels setting a desired angular position of said rear wheels; and third means cooperating with said front wheels and selectively engageable with said lever to operate said rear wheels in any one of a plurality of modes of operation, said third means, when engaged with said lever, actuating said valve spool as a function of the turning movement of said front wheels, said link including first and second elongated elements respectively connected to said spool and said connecting means; and means between said elements (1) normally causing said elements to move as a unit and (2) accommodating relative movement of said elements when said spool is at a maximum extreme operative position and an external force is applied to said link by said connecting means.

3,903,984

PNEUMATICALLY OPERATED CONTROL DEVICE FOR AUTOMATIC ALIGNMENT OF MOTOR VEHICLE LIGHTS

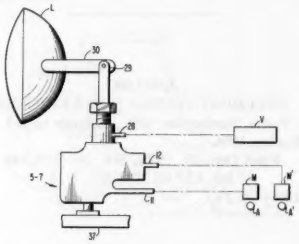
Rudolf Andres, Sindelfingen, and Hermann Möller, Aidlingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed June 7, 1973, Ser. No. 367,942

Claims priority, application Germany, June 7, 1972, 2227663

Int. Cl.[2] B60Q 1/10

U.S. Cl. 180—82 R **12 Claims**



1. A pneumatically operating control installation for the automatic alignment of motor vehicle headlights which includes pressure modulator means coordinated to the two axles of the motor vehicle which align the motor vehicle headlights to a constant light distance in dependence on the change of the distance of the respective axle to the body of the motor vehicle by way of a control element, a control shifting device and a working element, and in which the control installation is fed with a vacuum, characterized in that the control element, the control shifting device and the working element are arranged one behind the other in a structural unit consisting of a single housing means closed off on both sides by cover means.

3,903,985

SAFETY APPARATUS FOR USE IN A VEHICLE TO RESTRAIN THE MOVEMENT OF AN OCCUPANT

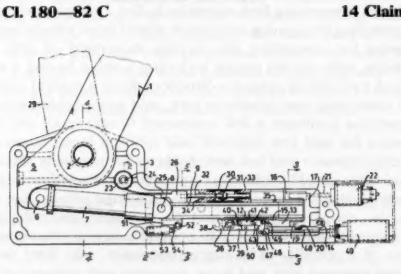
Geoffrey Grime, Swansea, England, assignor to Accles-Britax Limited, Warley, England

Filed Aug. 19, 1974, Ser. No. 498,763

Claims priority, application United Kingdom, Aug. 30, 1973, 40842/73

Int. Cl.[2] B60R 21/10

U.S. Cl. 180—82 C **14 Claims**



1. Safety apparatus for use in a vehicle to restrain the movement of an occupant, the safety apparatus comprising a housing for attachment to said vehicle; a shaft supported by said housing; a rigid arm having one end portion rotatably mounted on said shaft; a pad mounted at the other end of said arm for acting against the chest of said occupant; a recoiless energy absorption member coupled to said one end portion of said arm; a locking member coupled to said recoiless energy absorption member and slidably supported in said housing; a locking pawl mounted for movement in said housing to arrest movement of said locking member; means responsive to acceleration or deceleration of said vehicle for moving said pawl to lock said locking member; biasing means coupled between said housing and said arm for lightly biasing said arm towards said occupant's chest except when said locking member is locked; and means for operative connection to the footbrake system of said vehicle to move said pawl to lock said locking members when said footbrake system is operated.

3,903,986

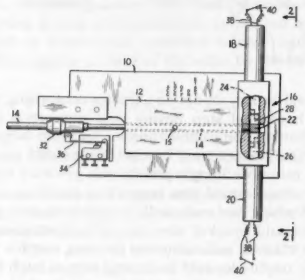
STEERING COLUMN LOCK

Arthur H. Smith, Maplewood, N.J., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Feb. 13, 1974, Ser. No. 441,954

Int. Cl.[2] B60R 25/04

U.S. Cl. 180—114 **5 Claims**



1. In a motor vehicle electrical system including an ignition switch having a plurality of positions selectively operable by an actuating mechanism on a longitudinally movable actuator bar, the improvement comprising:

a. at least two solenoids having rams with a common longitudinal axis;

b. a T-shaped locking member having two opposed legs and a third leg normal thereto;

c. one said solenoid being attached to one said opposed leg and being operative to move said T-shaped blocking member to a first position wherein the said third leg prevents longitudinal movement of said actuator bar to at least one of the positions of said ignition switch;

d. a second said solenoid being attached to the other of said opposed legs and being operative to move said T-shaped blocking member to a second position wherein the actuator bar is unobstructed of longitudinal movement by said third leg; and

e. means for operating each said solenoid independently of the other.

3,903,987

MUFFLER HOUSING

Howard L. Brown, and James F. Mowat, Jr., both of Michigan Center, Mich., assignors to Tenneco Inc., Racine, Wis.

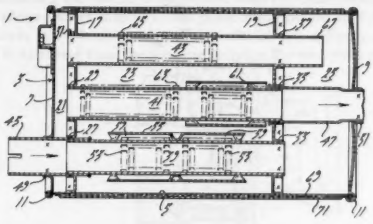
Filed Feb. 20, 1973, Ser. No. 333,955

Int. Cl. F01n 7/18

U.S. Cl. 181—61 **6 Claims**

1. A muffler comprising a tubular metal shell having a longitudinal seam, metal headers closing opposite ends of the shell, the ends of the shell and the peripheries of the headers being united in interlocked joints of reversely bent metal, portions at least of said joints being flattened and compressed together to increase the strength of said joints so that said joints have greater resistance to blow-out under excessive

internal pressure than does the longitudinal seam, said headers having inlet and outlet openings respectively, and gas flow and



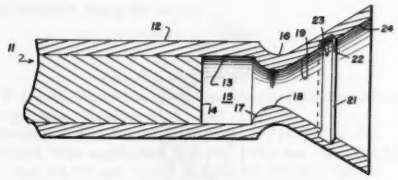
silencing structure in said shell connecting said inlet and outlet.

3,903,988

ROCKET NOISE GENERATOR

Robert William Hermsen, Palo Alto, and Paul G. Willoughby, Santa Clara, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 11, 1968, Ser. No. 766,700
Int. Cl.[2] G10K *10/00*
U.S. Cl. 181—142 **16 Claims**



1. A sound generator comprising in combination:

a propulsion nozzle, having a converging entrance section, a diverging exit section, and a throat section connected therebetween, for converting a predetermined fluid at a given pressure supplied to the entrance section thereof into a fluid having a given velocity that is ejected from the exit section thereof;

a groove located within and around the inside wall of the diverging exit section of said propulsion nozzle in such manner as to be contacted by said predetermined fluid as it passes therethrough and thereby effect the vibration thereof at a predetermined frequency; and

means connected to the converging entrance section of said propulsion nozzle for supplying said predetermined pressurized fluid thereto.

3,903,989

DIRECTIONAL LOUDSPEAKER

Benjamin B. Bauer, Stamford, Conn., assignor to CBS Inc., New York, N.Y.

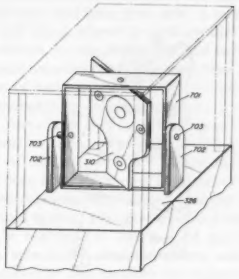
Filed May 20, 1974, Ser. No. 471,267
Int. Cl.[2] H05K *5/00;* **G10K** *7/00, 11/00*
U.S. Cl. 181—144 **12 Claims**

1. A directional loudspeaker system comprising:

a cabinet having a substantially closed lower compartment having a baffle board at the front thereof and a separate generally open-sided upper compartment,

a first loudspeaker driver for the low frequency range mounted on the front baffle board of said lower compartment to cause sound emanating therefrom to be essentially omnidirectional,

a generally planar baffle having substantially parallel upper and lower edges of unequal length joined by side edges supported vertically within said upper compartment and mounted for rotational adjustment relative to the cabinet about a generally vertical axis, and



at least a second loudspeaker driver for a frequency range above the frequency range of said first loudspeaker driver mounted on said baffle at a location as to constitute with a portion of the baffle a dipole radiator having an angle of directivity generally perpendicular to the plane of said baffle,

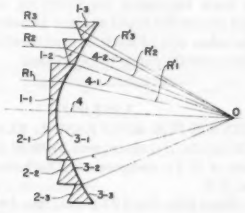
whereby the angle of directivity of said second loudspeaker driver can be varied relative to the cabinet as desired.

3,903,990

ACOUSTIC LENS

Yasuaki Tannaka, Hachioji, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 18, 1973, Ser. No. 407,450
Claims priority, application Japan, Oct. 18, 1972, 47-103585
Int. Cl. G10k *11/00*
U.S. Cl. 181—176 **16 Claims**



1. An acoustic lens which has an axis and focal length comprising:

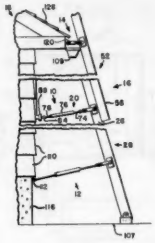
1. a central lens block, the lens axis and the focal length of which are coincident with those of said acoustic lens; and

2. a plurality of peripheral lens blocks which are disposed at the outer periphery of the central lens block in the form of planes adjacent said central lens, and in which incidence surfaces of the lens blocks are formed of plane faces inclined relative to the axis of said acoustic lens so that sound waves incident on said lens blocks will emerge from respective emergence surfaces of said blocks in a direction along lines connecting their respective points of emergence on the focal point side, and the focus of said acoustic lens, while said emergence surfaces of said lens blocks are formed of curved surfaces by which incident sound waves converge at the focus of said acoustic lens.

3,903,991
LADDER LOCKING ASSEMBLY

Richard D. Phelan, 51 Fairmount Ave., Somerville, Mass. 02144

Continuation-in-part of Ser. No. 382,033, Oct. 29, 1973, abandoned. This application June 24, 1974, Ser. No. 482,429
Int. Cl.² E06C *5/36, 1/34*
U.S. Cl. 182—93 **4 Claims**



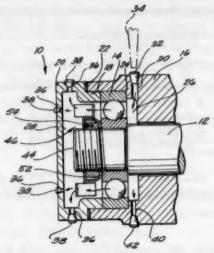
1. In a locking assembly for a ladder of the type having two sides and hollow rungs between the sides with each of the two ladder sides having a pair of rails and connecting web therebetween in the cross sectional form of substantially an I beam and the hollow rungs having two ends with each rung end fixed to the web adjacent the respective rung end, the combination of a pair of brackets with each of said brackets having a screw eye; means for fixing one of said pair of brackets in place at one of said sides and the other of said pair of brackets in place at the other of said sides, said means including a bracket rod having two ends and a cross sectional dimension for placing in the hollow of one of said rungs and being of a length such that said rod ends protrude from the respective sides of the ladder and are adapted for fastening the brackets at the respective sides of the ladder and including a spacer at each end of the bracket rod, each spacer having a surface for engaging said web and an opposed surface for clearing the associated ladder side to form a base for the associated bracket; a turnbuckle for each of said sides, each of said turnbuckles having opposed ends and carrying in each respective turnbuckle end an elongated turnbuckle rod, one of the rods for each turnbuckle includes a hook formation for fastening to said respective bracket; and means for rapid manual attachment and detachment of the other rod of each of said turnbuckles to a structure to which said ladder is to be locked.

3,903,992
DEVICE FOR REGREASING BEARINGS

Krishna Chivukula, Syracuse, and Wilfred J. Lee, East Syracuse, both of N.Y., assignors to Clarkson Industries, Inc., Syracuse, N.Y.

Filed Feb. 21, 1974, Ser. No. 444,288
Int. Cl. F01m *1/00*
U.S. Cl. 184—1 D **8 Claims**

1. A device for use in regreasing a bearing for a rotary shaft including a bearing, a shaft extending through said bearing, a bearing housing surrounding the bearing and a portion of said shaft, said housing having first and second grease chambers therein respectively located on opposite sides of the bearing, a grease injection opening formed therein providing communication between said first chamber and the exterior of said housing through which fresh grease is selectively injected into said housing and said first chamber, and at least one grease discharge opening formed therein providing communication between said second chamber and the exterior of said housing whereby grease injected under pressure into said first chamber is forced through said bearing into said second chamber and expels old grease in the housing through said discharge opening, and a grease discharge plate mounted on said shaft in said second chamber adjacent said bearing for rotary movement with said shaft, said grease discharge plate having at least one canted vane formed thereon at its periphery for forcing grease in said housing adjacent said bearing through said discharge

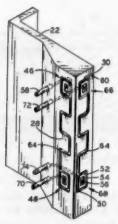


opening during rotation of the shaft and for assisting the movement of grease in said first chamber through said bearing into said second chamber and out said discharge opening.

3,903,993
HYDROSTATIC BEARING ARRANGEMENT FOR PRESS SLIDE

John E. Vorrhees, Sidney, and Robert L. Schockman, St. Henry, both of Ohio, assignors to The Minster Machine Company, Minster, Ohio

Filed Mar. 26, 1973, Ser. No. 345,097
Int. Cl.² F16N *1/00*
U.S. Cl. 184—5 **17 Claims**



1. In a press having a press frame and a slide reciprocable in the frame; guiding surface means formed on said slide and press frame parallel to the direction of reciprocation of the slide in the press frame, said guiding surface means comprising closely spaced equivalent pairs of parallel planar surfaces in opposed forced balancing relation one pair to another with one surface of each pair on the press frame and the other surface of each pair on the press slide, each said pair of surfaces having at least one hydrostatic bearing area operatively interposed therebetween, adjusting means for controlling the clearance space between said opposed planar surfaces, means for supplying fluid under pressure to said hydrostatic bearing areas, and means for maintaining a fluid squeeze film between the said surfaces of each pair of surfaces outside the range of said hydrostatic bearing areas.

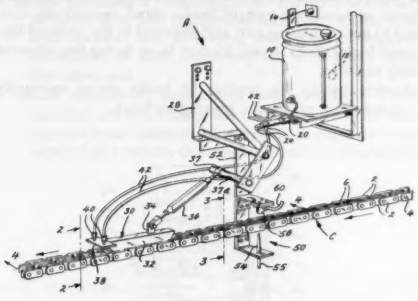
3,903,994
LUBRICATING APPARATUS FOR CONVEYOR CHAINS WITH LUBRICATING SIGNALING MEANS

Henry F. Hafner, 9030 Saranac, Richmond Heights, Mo. 63117

Filed May 22, 1974, Ser. No. 472,299
Int. Cl.² F16N *7/30*
U.S. Cl. 184—15 A **15 Claims**

1. An apparatus for lubricating a chain having links arranged in spaced apart rows and cross pieces connecting the links and including rollers located between the rows, said apparatus comprising: a source of lubricant; delivery means

connected to the source of lubricant for delivering a quantity of lubricant to the chain upon receipt of a signal, the delivery means including a nozzle which is positioned adjacent to the chain and is directed toward the links; positioning means for maintaining the nozzle in alignment with the chain links when the chain moves laterally, the positioning means including a follower bar which carries the nozzle of the delivery means and is narrower than the spacing between the two rows of links



and rides on the rollers between the rows of links, and restraining means for preventing the bar from moving longitudinally with the chain, while permitting it to move laterally with the chain; and control means connected with the delivery means and located remote from the chain so as to be out-of-contact with the chain for generating a signal which causes the delivery means to deliver lubricant through the nozzle to the proper location along the chain.

3,903,995

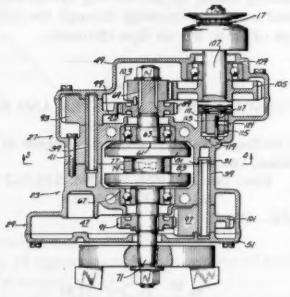
BALANCING SYSTEM

Finn T. Irgens, Wauwatosa, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Division of Ser. No. 108,443, Jan. 21, 1971, Pat. No. 3,725,238. This application July 16, 1973, Ser. No. 379,360

Int. Cl.[2] F16N *13/10;* **B26D** *7/08;* **F04B** *27/00*

U.S. Cl. 184—27 **4 Claims**



1. A chain saw including an internal combustion engine comprising an engine block defining a crankcase and a cylinder extending from said crankcase, a piston reciprocable in said cylinder, a connecting rod connected to said piston, a crankshaft rotatably mounted by said engine block and including first and second end portions coaxial with said crankshaft rotational axis and extending exteriorly of said crankcase from the opposite sides of said engine block, a crank pin offset form the crankshaft rotational axis and located within said crankcase, and first and second crank cheeks located within said crankcase and connecting the ends of said crank pin to said first and second crankshaft end portions, a first pinion mounted on said first crankshaft end portion exteriorly of said crankcase, a second pinion mounted on said second crankshaft end portion exteriorly of said crankcase, a first gear mounted on said engine block exteriorly of said crankcase and in mesh with said first pinion for rotation about an axis parallel to said crankshaft rotational axis, and a second gear mounted on said engine block exteriorly of said crankcase and in mesh with said second pinion for rotation about an axis parallel to said crankshaft rotational axis and in the plane defined by said crankshaft axis and said first gear axis, a member rotatably journalled in said block about an axis parallel to said crankshaft axis and driven by one of said first and second crankshaft end portions, said member having an axial bore offset from the axis of rotation of said member, a lubricant pumping element reciprocably movable in said bore, means for reciprocating said pumping element in said bore in response to rotation of said member and including a spring in said bore seated against the inner end of said element and urging said element outwardly of said bore and cam means fixed on said engine block and engaged by the outer end of said element in response to the action of said spring, whereby to effect reciprocation of said member in response to rotation of said member, and porting means selectively communicating with said bore in response to rotation of said member for supplying lubricant to said bore and for delivering lubricant from said bore.

3,903,996

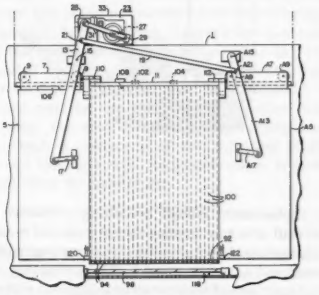
CLOSURE SYSTEM

Harry Berkovitz, Glen Rock, and Lawrence Tosato, Millburn, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Dec. 18, 1973, Ser. No. 426,180

Int. Cl.[2] B66B *13/26;* **E05F** *15/20*

U.S. Cl. 187—52 **1 Claim**



1. An elevator system, comprising:

an elevator car having an entranceway,

a door for said entranceway,

means mounting said door for movement to open and close said entranceway,

a sill associated with said entranceway, said sill including a portion which extends outwardly past the external side of said door when said door closes said entranceway, with this portion of said sill including a plurality of spaced openings which extend substantially across the entranceway,

a source of radiant energy disposed below said sill providing a plurality of beams of radiant energy which extend substantially vertically upward through the plurality of spaced openings in said sill,

detector means positioned to receive at least certain of said beams of radiant energy, said detector means including a first detector device mounted to move with the door and provide an object detection zone adjacent the leading edge thereof upon closure, and a second detector device mounted on a stationary portion of the entranceway to

provide a stationary object detection zone in the entranceway,

said detector means being responsive to an object interrupting the radiant energy received by either the first or second detector device, for controlling the operation of said door,

auxiliary transmitter means mounted on the car door and aimed at the first detector device,

and means responsive to the failure of the source of radiant energy, for energizing said auxiliary transmitter means, to provide a beam of radiant energy for the first detector device.

3,903,997

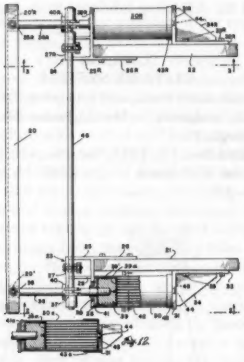
REPLACEMENT IMPACT ABSORBING CONTAINER

Ralph J. Brooks, Langhorne, Pa., assignor to Andrew R. Klein, trustee, Philadelphia, Pa.

Division of Ser. No. 175,668, Aug. 27, 1971, Pat. No. 3,851,911. This application Aug. 24, 1973, Ser. No. 457,670

Int. Cl.[2] B65D *25/00, 85/08, 85/54, 85/70*

U.S. Cl. 188—1 C **1 Claim**



1. A replacement energy absorbing container having peripheral wall structure made of sheet material possessing high hoop strength, said container having a transverse closure plate at one end and a closure at said other end having an opening; a mass of corrugated sheet material disposed within said container and extending from said transverse closure plate throughout at least a major portion of the length of said container, the corrugated sheet material being disposed with its flutes extending in a lengthwise direction, said container being configured and adapted to mate with and be supported between spaced elements of a shock dissipating system for vehicles, said mass corrugated sheet material being dimensioned and arranged to accommodate the head of a piston between said other end of the container and said corrugated material.

3,903,998

DISC BRAKE COALING STRUCTURE

Hermann Klaue, 24, Tour D'Ivoire, 1820 Montreaux, Switzerland

Continuation-in-part of Ser. No. 161,607, July 12, 1971, abandoned. This application Dec. 27, 1972, Ser. No. 318,825

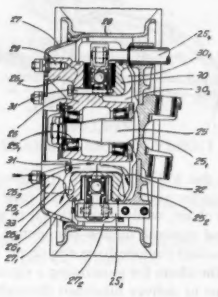
Claims priority, application Switzerland, June 1, 1972, 8097/72; Sept. 18, 1972, 13610/72; Nov. 10, 1972, 16384/72

Int. Cl. F16d *55/04*

U.S. Cl. 188—71.3 **11 Claims**

1. A disc brake comprising: an axially elongated hub mounted on a non-rotational part for rotation relative thereto, a brake housing comprising an annular member having an inner portion and first and second radial portions extending radially outwardly from said inner portion and forming between them an annular gap of channel-like cross-section opened on its radially exterior side, at least part of the inner portion and one of said radial portions of the brake housing being cast integrally with said hub and with a set of spokes which extend radially outwardly from the hub, the opposite inner sides of said channel-like gap providing annular braking surfaces, at least one pair of brake shoes operatively connected to a non-rotating part and disposed in the channel-like gap, said brake shoes having friction faces facing the adjacent braking surfaces,

actuating means for urging the brake shoes outwardly against their respective braking surfaces,



radially extending ribs on the outer sides of the said first and second portions opposite from said braking surfaces defining between them outwardly opening channels,

and including air flow channels extending axially completely through the said casting radially inwardly of said annular gap, said air flow channels connecting directly into the channels formed by said ribs to carry cooling air to the said inner portion of the brake housing and from there radially outwardly along the outer sides of the first and second portions through the rib formed channels,

and including means for connecting the spokes to a wheel rim, and including openings through the spokes for the passage of air to the air flow channels.

3,903,999

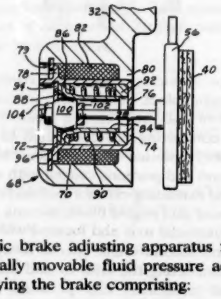
EXTENSIBLE BRAKE ADJUSTER AND RESET APPARATUS

Richard J. Ditlinger, South Bend, Ind., assignor to The Bendix Corporation, South Bend, Ind.

Filed Dec. 5, 1974, Ser. No. 529,762

Int. Cl.[2] F16D *65/54*

U.S. Cl. 188—196 R **11 Claims**



1. Automatic brake adjusting apparatus for a disc brake having an axially movable fluid pressure actuated pressure plate for applying the brake comprising:

an annular housing provided with a plurality of circumferentially spaced apart cavities;
a radially deformable annular member disposed in each of said cavities;
an axially deformable annular member disposed in each of said cavities and bearing against fixed stop means at one end thereof and in concentric relation to said radially deformable member;
means including a button member fixedly secured to said pressure plate and engageable with said radially deformable member for deforming the latter in response to movement of said pressure plate in a brake applying direction; and
means operatively connecting said radially deformable member and said axially deformable member for deforming said axially deformable member in response to movement of said radially deformable member. tubular column

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3,904,000

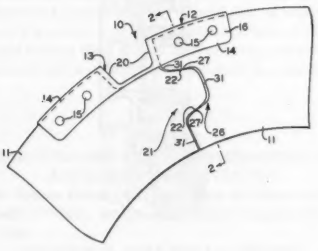
SEGMENTED BRAKE DISK

Robert E. Berger, North Canton, Ohio, assignor to Goodyear Aerospace Corporation, Akron, Ohio

Filed Jan. 16, 1974, Ser. No. 433,818

Int. Cl. F16d *65/12*

U.S. Cl. 188—218 XL **8 Claims**



1. A segmented brake disk, comprising
a plurality of segments, at least a portion of said segments having a tongue,
at least a portion of said segments having a recess,
said tongue having tapered arcual surfaces and a radial surface,
said recess having tapered arcual surfaces and a radial surface,
said tongue tapered arcual surfaces and said recess tapered arcual surfaces matingly engaging each other, said segments contacting each other only through said tapered arcual surfaces, said contact of said tapered arcual surfaces being along a minor fractional portion thereof; and
said tongue and recess arcual surfaces so engaging each other to form a radial expansion gap between said radial surfaces of said tongue and said recess under all braking conditions.

3,904,001

VIBRATION DAMPER WITH A HERMETICALLY CLOSED DAMPING CHAMBER

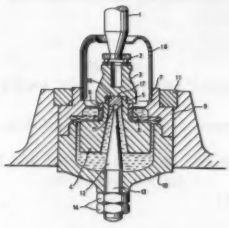
Frederik Herman Theyse, Bensberg-Herkenrath, Germany; John Louis Joseph Marie Janssen, Amsterdam, and Erick Willem Johan Takes, Purmerend, both of Netherlands, assignors to Reactor Centrum Nederland, The Hague, Netherlands

Filed June 30, 1972, Ser. No. 268,165

Claims priority, application Netherlands, June 30, 1971, 7109007

Int. Cl. F16f *15/10*

U.S. Cl. 188—266 **3 Claims**



1. A vibration damper for a body which, being supported on one or more running bearings, rotates rapidly about its axis, which damper is provided with a hermetically closed vessel filled with damping fluid and a damping member mounted therein, which latter permits of radial movement with respect to the vessel against a return force, which damping member is fixed by means of a coupling member to one of the said running bearings, this coupling member and this damping member fixing gastight between them a membrane-like portion of the wall of the vessel, in which said membrane-like wall portion is bounded by and forms an integral part of a thickened hub-like inner part on the one hand and a likewise formed rim-like outer part on the other hand, together forming a membrane ring, the said membrane ring having a rim-like outer part which is composed of two cylinders of different diameters and having a wall thickness which is about 100 times thicker than the membrane.

3,904,002

HYDROPNEUMATIC VIBRATION DAMPER

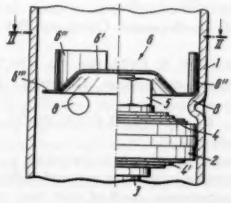
Adolf Adrian, and Johannes Jasper De Baan, both of Ennepetal, Germany, assignors to Firma August Bilstein, Ennepetal, Germany

Filed June 6, 1974, Ser. No. 476,774

Claims priority, application Germany, June 22, 1973, 2331852

Int. Cl. F16f *9/40*

U.S. Cl. 188—269 **8 Claims**



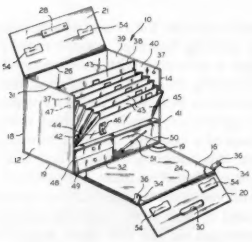
1. A hydropneumatic single tube vibration absorber particularly adapted for use with motor vehicles, comprising a cylinder filled with damping liquid and a compressed gas, a work-

ing piston reciprocally movable within said cylinder in said damping liquid, a piston rod connected to said piston and extending to the exterior of said cylinder through a seal disposed at the point of piston rod penetration of said cylinder, a movable baffle disposed below the interface between said gas and damping liquid and having guide tongue projections on its outer periphery extending parallel to the logitudinal cylinder axis and adapted to slidably engage the cylinder wall, said baffle periphery having openings between said tongues for passage of said damping liquid; said tongues being of curvilinear sectional configuration so as to be able to engage adjacent wall portions of said cylinder in such manner that tilting and jamming of said baffle is avoided and said baffle is readily reciprocally movable in the normal course of absorber use, and stop means limiting the movement of said baffle into said damping liquid.

3,904,003
COMBINATION CARRYING CASE AND TRAVELING DESK

Charles Margerum, 5108 S. Woodlawn Ave., Chicago, Ill. 60615

Filed Feb. 20, 1974, Ser. No. 444,129
Int. Cl. A45c *9/00*
U.S. Cl. 190—11 **13 Claims**



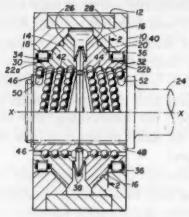
1. A combination case and desk device comprising:
a substantially box-like configuration including a pair of side walls, end walls, a bottom wall, an upper flap being associated with one of said side walls and positioned inward and toward the other side wall when closing the top of the device, said flap being pivotable from said inward position to an outward position when said one side wall is in the upright-position, said one side wall being movable from the upright-position to a lowered-position for converting the device from a case to a desk, said flap also moving to said lowered-position with said one side wall.

3,904,004
OVERRUNNING CLUTCH

Anton Marx, Sulzthal, Germany, assignor to SKF Industrial Trading and Development Company B.V., Amsterdam, Netherlands

Filed Feb. 5, 1974, Ser. No. 439,705
Claims priority, application Germany, Feb. 8, 1973, 2306188
Int. Cl.[2] F16D *41/00, 69/00*
U.S. Cl. 192—41 R **10 Claims**

1. An overrunning clutch comprising a rotatable outer member, a rotatable inner member and roller bearing means interposed therebetween, each of said inner and outer members having annular opposing frictionally engaging surfaces, resilient means normally biasing said members toward each other, a plurality of grooves formed in the annular surface of one of said members for retaining a fluid media, said media increasing in pressure on relative rotation of said members to create a fluid force between said opposing surfaces acting

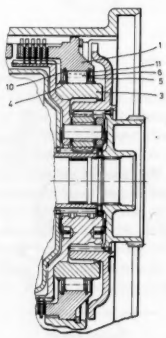


opposite to said resilient means, thereby to disengage said opposing surfaces.

3,904,005
OVERRUNNING CLUTCH

Horst Husmann, Wolfsburg, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Germany

Filed Mar. 22, 1974, Ser. No. 453,576
Claims priority, application Germany, Apr. 6, 1973, 2317208
Int. Cl.[2] F16D *3/34, 15/00*
U.S. Cl. 192—45 **5 Claims**

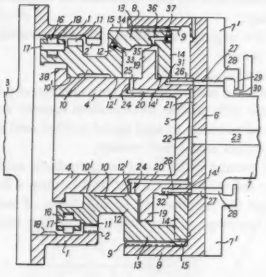


1. An overrunning clutch, comprising in combination,
a plurality of circumferentially spaced clamp rollers;
an outer coupling element and an inner coupling element, one of said coupling elements being provided with clamp ramps for said clamp rollers, the other of said coupling elements forming a cylindrical running surface for said clamp rollers;
a cage arranged between said outer and said inner coupling elements and including a pair of lateral disks of annular shape and which are axially spaced with respect to each other with said clamp rollers located therebetween; and a plurality of expansion springs each located between said disks and intermediate two circumferentially spaced ones of said clamp rollers, the contour of a first one of said disks facing said one coupling element being of substantially cylindrical shape and the other disk having a corresponding contour but being provided with projections extending beyond its contour, said one coupling element having recesses and said projections of said other disk bearing against said recesses when said cage is assembled and arranged between said outer and inner coupling elements.

3,904,006
SYNCHRONOUS SELF-SHIFTING CLUTCH

Herbert Arthur Clements, Weybridge, England, assignor to S.S.S. Patents Limited, London, England

Filed Nov. 8, 1973, Ser. No. 413,976
Claims priority, application United Kingdom, Nov. 13, 1972, 52367/72
Int. Cl. F16d *23/02*
U.S. Cl. 192—67 A **5 Claims**



1. A toothed clutch comprising sets of coacting engageable and disengageable clutch teeth, a hydraulic dashpot including a dashpot cylinder and a dashpot piston for cushioning at least the final part of the relative interengaging movement of said sets of clutch teeth, and at least one first fluid supply duct for supplying cushioning fluid to said dashpot, said first fluid supply duct opening externally of the clutch at a first location for connection to a source of cushioning fluid, with the improvement comprising at least one second fluid supply duct for supplying fluid to said dashpot cylinder, when said sets of clutch teeth are interengaged, at one side of the dashpot piston such that disengagement of said sets of clutch teeth is resisted by the pressure of fluid on said one side of the dashpot piston, said second fluid supply duct opening externally of the clutch at a second location for connection to a second source of fluid.

3,904,007
FLUID ENGAGED CLUTCH WITH SPEED AND ACCELERATOR CONTROLS

Eugene R. Braun, Royal Oak, and Elmer A. Richards, Kalamazoo, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Oct. 9, 1973, Ser. No. 404,221
Int. Cl.² F16D *43/284*; **B60K** *29/00*
U.S. Cl. 192—.076 **2 Claims**

1. A control system for a transmission driven through fluid pressure-actuated clutch means by a prime mover and drivingly connected to a load, comprising in combination:

a source of pressure fluid;

passage means connecting said source to said clutch means for permitting the flow of pressure fluid therebetween;

valve means associated with said passage means and shiftable between open and closed positions for controlling the flow of pressure fluid from said source to said clutch means;

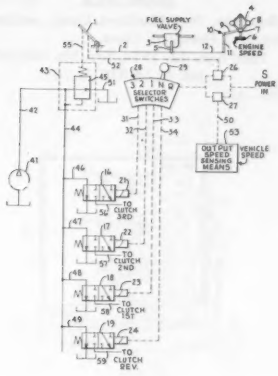
throttle control means including a manually moveable throttle control member for controlling the speed of said prime mover, the output torque of said prime mover being in a predetermined relationship to the position of said throttle control member;

control means responsive to the position of said throttle control member for controlling the pressure fluid as supplied to said clutch means to maintain the torque transmitting capacity of said clutch means at a magnitude having a predetermined relationship to the output torque of said prime mover;

actuating means operative when activated to move said valve means from said closed position to said open position, said actuating means including

manually controllable shift selector means moveable between an inactive position and an active position,

first means connected in series with said selector means and responsive to manual displacement of said throttle



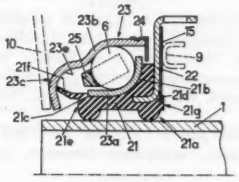
control member for activating said actuating means when said shift selector is in said active position, and

second means connected in parallel with said first means and responsive to the output speed of said transmission exceeding a predetermined minimum for activating said actuating means when said shift selector is in said active position.

3,904,008
CLUTCH RELEASE BEARING HAVING RESILIENT CENTERING AND SILENCING MEANS

Claude Sonnerat, Annecy, France, assignor to Societe Nouvelle de Roulements, Annecy, France

Filed Apr. 12, 1974, Ser. No. 460,640
Claims priority, application France, May 15, 1973, 73.17589; Dec. 3, 1973, 73.44668
Int. Cl. F16d *23/14*
U.S. Cl. 192—98 **5 Claims**



1. A clutch release bearing assembly comprising a centering and silencing ring formed from a resilient flexible material capable of being injection or compression molded, a thrust bearing having an inner race and a rotating outer race, clutch release actuating means for axially moving said thrust bearing to disengage the clutch, said centering and silencing ring being mounted on said thrust bearing for axial sliding movement on a bearing guide tube and being mounted onto said actuating means, and an annular recess formed in the inner surface of said centering ring to allow the ring to be radially and angularly deformed to permit both resilient centering and aligning

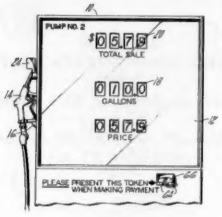
of the bearing axes relative to the axis of the clutch and to substantially eliminate noise during the entire clutching operation, said recess also defining an annular lubricant reservoir between said ring and said guide tube.

3,904,009

FLUID DISPENSING SYSTEM HAVING TOKEN DISPENSER

Coates F. Bateman, West Hartford, Conn., assignor to Veeder Industries, Inc., Hartford, Conn.

Filed Apr. 12, 1974, Ser. No. 460,607
Int. Cl.[2] G07F *13/10*
U.S. Cl. 194—13 **11 Claims**



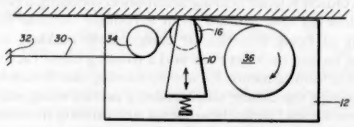
1. A fluid delivery system having an operating cycle with delivery and nondelivery phases; a nozzle movable into and out of a storage position; a register for registering the amount of fluid delivered by the nozzle during the delivery phase, said register being resettable to a zero setting between successive fluid deliveries; control means operable upon movement of the nozzle into and out of its storage position and including a lever movable during the nondelivery phase to permit delivery and a reset shaft movable in response to movement of said lever for controlling the resetting of the register; a token dispensing mechanism for dispensing a token during each operating cycle comprising a token storage compartment having a token port, and a token metering member movable between a token receiving station at said outlet port and a token dispensing station and adapted to receive a token from the outlet port of the storage compartment when positioned in the token receiving station, and reset shaft mounting a drive member directly engageable with said token metering member for driving the metering member toward the token dispensing station.

3,904,010

TYPEWRITER CARRIAGE ASSEMBLY

Otto Krauss, Nuremberg; Hans Eder, Goethering; Peter Niederhametner, Nuremberg; Arend Richter, Nuremberg, and Norbert Zimmermann, Nuremberg, all of Germany, assignors to Triumph Werke Nurnberg A.G., Nuremberg, Germany

Filed July 5, 1973, Ser. No. 376,723
Claims priority, application Germany, July 14, 1972, 2234616
Int. Cl.[2] B41J *3/05*
U.S. Cl. 197—1 R **5 Claims**



1. A carriage assembly for selectively displacing a printing head of a typewriter or the like across the information carrier thereof which is supported by a typewriter platen or the like comprising,

a carrier adapted to be mounted on the typewriter at a predetermined distance from the typewriter platen, said carriage including

a printing head having a plurality of pins which are adapted to be selectively impacted against the information carrier,

roller means mounted on said printing head with the axis of rotation of said roller means extending in a direction perpendicular to the direction of displacement of said carriage,

means for urging said roller means towards the information carrier,

a spring actuated spool,

elongated band means having one end fixedly located proximate one side of the information carrier and having the other end secured to said spool so that said spool will take up or unreel said band means,

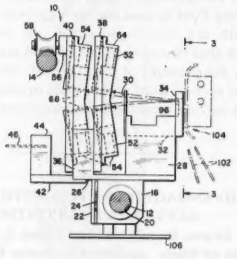
said band means interposed intermediate said roller means and the information carrier and having a length selected to permit the progressive laying down of said band means as said carriage is displaced across the information carrier.

3,904,011

PRINTING HEAD FOR MATRIX PRINTER

Arthur L. Matschke, Westport, Conn. and Jack K. Horowitz, Laurelton, N.Y., assignors to Tele Speed Communications Inc., Syosett, N.Y.

Filed Oct. 17, 1973, Ser. No. 407,236
Int. Cl.[2] B41J *3/05*
U.S. Cl. 197—1 R **20 Claims**



1. Printing head for dot-matrix printing at a printing face comprising:

means for supporting said printing head within a printer;

electromagnet mounting means on said support means spaced from the printing face of said printer and including vertical plate means having a large diameter bore therein;

printing wire collector plate means mounted on said support means adjacent the printing face of said printer and having a single printing wire aperture therein; the axis of which defines the centerline axis of a character to be printed;

a plurality of electromagnets mounted around the periphery of said bore and having armature means terminating in shoe means extending at their distal ends to near said centerline axis at a small angle to a plane normal to said axis;

each said electromagnet including a core having an axis extending radially from said centerline axis;

energizing of said electromagnets functioning to move said distal end of said shoe means toward said aperture a distance equal to a desired printing wire stroke; and

printing wire means extending from each said shoe means into said aperture and terminating in a plane parallel and

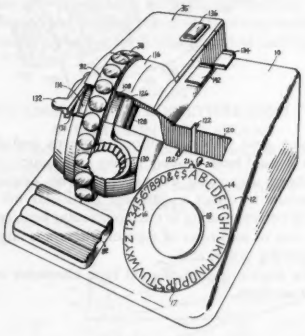
closely adjacent to said printing face, each said printing wire means describing an arc of large radius.

3,904,012

ADJUSTABLE SPACING EMBOSSER

Murray Friedel, Miami, Fla., assignor to Visual Graphics Corporation, Tamarac, Fla.

Filed Jan. 25, 1974, Ser. No. 436,843
Int. Cl.[2] B41J *1/60*
U.S. Cl. 197—6.7 15 Claims



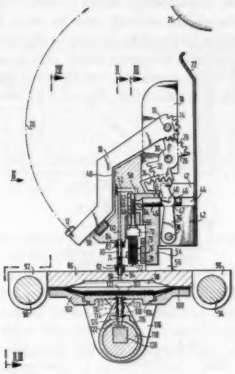
1. A tape embossing device for embossing alpha-numeric characters (16) with visually adjustable spacing capabilities in relationship to the prior embossed character on the tape (42) comprising a housing (10), a font ring (32) rotatably mounted on said housing (10), said font ring (32) having a plurality of selectable alpha-numeric character dies (34) thereon, means (14, 18) on said housing for rotating a selected alpha-numeric character die (34) to an embossing station (36), means (126, 128) for controllably moving the tape (42) in either direction to or through the embossing station (36), means (82) for embossing the selected die character on said tape (42) at the embossing station (36), means (38) for making the last previously embossed character (40) on said tape (42) and the next selected character die (34) on said font ring (32) simultaneously visible to the operator, manually operable means (130) for operating said tape moving means (126, 128) to kern and to adjust the spacing between said last previously embossed character (40) on said tape (42) and said next selected character die (34) of said font ring (32) whereby said next selected character may then be embossed in said tape (42) in a desired kerned, adjusted relationship (46) to the last previously embossed character in said tape (42), said font ring (32) being of transparent material, said simultaneous visibility means including lens means (38) on said transparent font ring (34) through which said station located characters (34, 40) may be observed, said adjustably spacing means including a spacing rule means (50) countersunk in said font ring (34) having aligning edges (52) aligned with said character dies (34) for aligning said embossed character (40) against said next selected character die (34), said countersunk spacing rule means permitting said embossed character to pass thereby free of contact therewith.

3,904,013

WRITING MACHINES WITH FLUID DRIVE MEANS

Hermann Rummel, Doerentrup, Germany, assignor to Nixdorf Computer AG, Paderborn, Germany

Filed Apr. 26, 1973, Ser. No. 354,705
Claims priority, application Germany, May 4, 1972, 2221871
Int. Cl. B41j *23/20*
U.S. Cl. 197—15 28 Claims



1. A writing machine of the kind in which successive writing of characters side by side and line by line is effected on a record carrier by means of a plurality of character carrying type bars arranged side by side of an arcuate pivot axis in their at rest position and adapted, when actuated, to pivot to effect recording at a common recording point, said record carrier mounted on a platen and including means to incrementally move said platen, comprising:

a. a fluid drive,

b. a plurality of fluid driven members, at least one of said fluid driven members associated with each said type bar and operable when fluidly connected to said fluid drive to pivot the type bar associated with said drive member to said common recording point,

c. a plurality of selector valve means, one of said selector valve means associated with each of said fluid driven members,

d. common means fluidly communicating said fluid drive to each of said selector valve means;

e. first means to selectively actuate said selector valve means to selectively fluidly communicate said fluid drive to the driven member to pivot the selected type bar to the common recording point, and

f. second means for fluidly communicating said fluid drive to the driven member of the selected type bar to urge the selected type bar toward its at rest position.

3,904,014

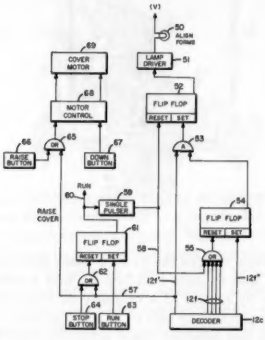
INDICATOR SYSTEM FOR ON LINE PRINTER

James L. Lipo, Plymouth Meeting, and Ralph W. Mahoney, Telford, both of Pa., assignors to Sperry Rand Corporation, Blue Bell, Pa.

Filed Nov. 19, 1973, Ser. No. 417,318
Int. Cl.[2] B41J *15/00*
U.S. Cl. 197—133 R 3 Claims

1. In a printer system having, (*a*) a printer mechanism, (*b*) a program variable signal source which provides a plurality of different command signals to effect different operations of said printer mechanism at different times, and (*c*) a printer control section for effecting said different operations of said printer mechanism in response to different ones of said com-

mand signals received from said program variable signal source; the improvement which comprises: a first settable device capable of being set in first and second conditions and connected to said program variable signal source and including first condition signal output means to provide a first condition signal thereon in response to the receipt of a first predetermined command signal from said program variable signal source; a second settable device capable of being set in first and second conditions and including a second condition signal output means whereat a second condition signal is provided in response to said second settable device being placed in its second condition; coincidence signal means connected to said program variable signal source and to said first condition signal output means to provide an output signal in response to the receipt of a second predetermined command signal from said program variable signal source in combination with the presence of said first condition signal; circuitry means connecting the output of said coincidence signal means to said second settable device for causing said second settable device to be transferred to its second condition; noncoincidence gate means; a plurality of circuit means connecting said noncoincidence gate means to said program variable signal source to provide an output signal in response to the receipt of any command signal from said program variable signal source other than said first or second predetermined command signal; second circuitry means connecting the output means of said noncoincidence gate means to said first settable device to cause such first settable device to be placed in its second condition; an indicator means coupled to said second condition signal output means for indicating said second condition of said second settable device whereby the user of said printer system can determine that said first predetermined command signal preceded said second predetermined command signal and no other command signals were transmitted to said first settable device in between.



3,904,015

POWER-DRIVEN TYPEWRITER

Robert E. Boyden, 5040 Sereno Dr., Temple City, Calif. 91780, and Rii Watanabe, 570 Takyo, Ohito-machi, Tagata-gun, Shizuoka, Japan

Filed Nov. 7, 1972, Ser. No. 304,365

Int. Cl. B41j *33/14*

U.S. Cl. 197—151 **13 Claims**

1. A typewriter comprising a carrier,

means supporting said carrier for movement along a record medium, a single element printing head having a plurality of rows of type characters thereon spaced apart in a first direction,

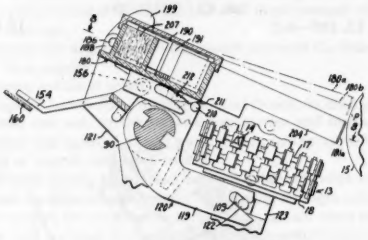
head guide means on said carrier guiding said head for movement in said first direction,

head moving means for moving said head in said first direction to different positions to align different ones of said rows of type characters at a printing point,

ribbon mounting means supported by said carrier for receiving an ink transfer ribbon,

ribbon positioning means responsive to said head moving means for moving said ribbon in said first direction to different ink transferring positions relative to said printing point, said ribbon positioning means including first means on said head moving means and second means on said ribbon mounting means operatively engaging said first means to effect a different particular ink transfer position corresponding to each particular head position in which one of said rows of type characters is aligned with said printing point, and

means for imprinting an aligned type character onto said record medium.



3,904,016

TYPEWRITER RIBBON ARRANGEMENT HAVING INTERCHANGEABLE RIBBON LOADABLE CARTRIDGES WITH ATTACHED MOVABLE RIBBON LIFTERS

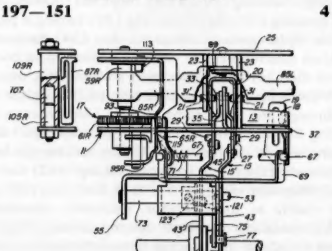
Hans-Georg Hengelhaupt, Nuernberg, Germany, assignor to Triumph Werke Nurnberg A.G., Nuremberg, Germany

Filed July 25, 1973, Ser. No. 382,508

Claims priority, application Germany, Aug. 9, 1972, 2239116

Int. Cl.² B41J *33/14*

U.S. Cl. 197—151 **4 Claims**



1. A ribbon lifting and feed arrangement comprising

a base portion for interchangeably mounting a first ribbon loadable cartridge and a second ribbon loadable cartridge,

each of said first and second cartridges having a pair of rotatable spindles for supporting supply and take-up ribbon spools and having a ribbon lifter pivotally supported thereon for lifting a length of ribbon threaded therethrough,

first and second ribbon lifter drive means for pivoting said ribbon lifters pivotally mounted on said first and second

cartridges respectively when one or the other cartridge is mounted on said base portion,

said first and second ribbon lifter drive means including corresponding first and second drive levers pivotally supported on said base portion in spaced-apart relation to each other for imparting different driving movements to the ribbon lifters of said first and second cartridges,

said ribbon lifters of said first and second cartridges each having a coupling arm positioned for cooperative engagement with the corresponding first and second drive levers of said first and second ribbon lifter drive means,

said first and second drive levers each carrying a coupling pin for engagement with the coupling arm of the corresponding ribbon lifters of said first and second cartridges, and

said coupling arms of the ribbon lifters of said first and second cartridges each having a slot formed therein for receiving the coupling pin of said corresponding first and second drive levers upon attachment to said base portion.

3,904,017

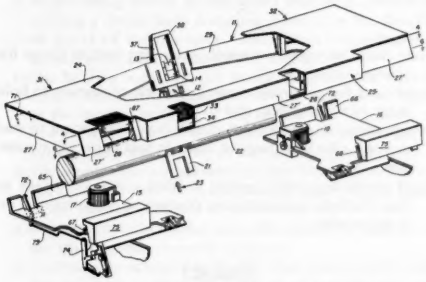
RIBBON CASSETTES WITH PRETHREADED VIBRATOR AND RIBBON FEED MEANS

Thomas E. Frechette, Windsor Locks, Conn., assignor to Litton Business Systems, Inc., New York, N.Y.

Filed June 3, 1974, Ser. No. 475,652

Int. Cl.[2] B41J *33/14*

U.S. Cl. 197—151 **10 Claims**



1. A ribbon cartridge to be operatively mounted in a typewriter having ribbon drive means and ribbon elevating means, said cartridge comprising a first and a second housing, ribbon mounted in said first and second housings, and housing connectors having ribbon passageways communicating with openings in said housings, said connectors joining said housings in spaced apart relationship defining an opening between housings, prethreaded ribbon vibrator means slidably mounted midway of one of said connectors and engagable with and elevatable by said ribbon elevating means, and

ribbon feed means mounted in said first housing, said feed means being engagable with and drivable by said ribbon drive means to pull said ribbon from housing to housing through said vibrator means.

3,904,018

INK RIBBON MECHANISM AND CARTRIDGE FOR IMPACT PRINTERS

Ronald S. Denley, Niles, Ill., assignor to Teletype Corporation, Skokie, Ill.

Division of Ser. No. 153,312, June 15, 1971, Pat. No. 3,793,951. This application Nov. 12, 1973, Ser. No. 415,047

Int. Cl.[2] B41J *33/26, 33/04*

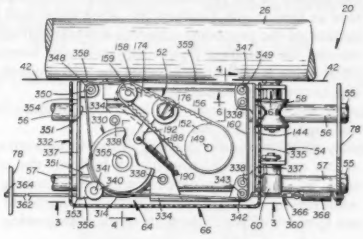
U.S. Cl. 197—168 **9 Claims**

1. In an impact printer wherein an inpactor is movable into and out of a printing mode and supported on a carriage arranged for reversible movement in a linear path to successive stations between line-start and carriage-return positions, the improvement comprising:

an endless ribbon;

means for driving the ribbon in a circuitous path for aligning successive ribbon segments with the impactor for printing;

a pulley wheel mounted on the carriage and responsive to carriage movement for coupling the driving means to carriage movement;



a pawl means connected to the driving means for enabling actuation of the driving means; and

a ratchet connected to the pulley wheel for drivingly engaging the pawl means to actuate the driving means when the carriage moves in one direction, the pawl means being cammed over the ratchet as the carriage moves in the opposite direction thereby preventing actuation of the driving means.

3,904,019

METHOD AND CONVEYING PATH FOR THE SEPARATION OF AT LEAST ONE SIGNATURE FROM A STREAM OF SIGNATURES

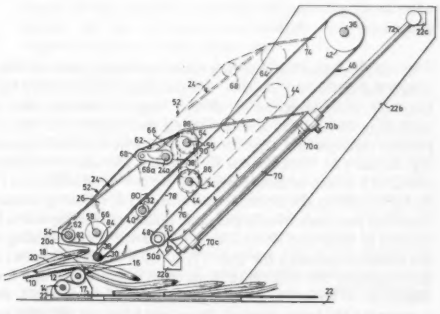
Bo Robert Junior Carlen, Sollentuna, and Anders Ingvar Andersson, Farsta, both of Sweden, assignors to Ahlen & Akerlunds Forlags AB, Stockholm, Sweden

Filed Sept. 17, 1973, Ser. No. 398,072

Claims priority, application Sweden, Sept. 21, 1972, 12207/72

Int. Cl.[2] B65G *47/26*

U.S. Cl. 198—31 AB **7 Claims**



1. A method for separating a least one signature from a stream of signatures fed in a downstream direction from an upstream location along a conveying path having a main path and a branch path selectively movable towards the main path for conveying a stream of signatures, weekly journals, brochures or the like, which are arranged in overlapping fashion and have spines facing forward and in the downstream direction of the main path, said signatures each having a bottom and a top surface whereby each bottom surface engages the top surface of the preceding adjacent downstream signature and each top surface engages the bottom surface of the suc-

ceeding adjacent upstream signature, the spines of each signature being a spaced distance from the spines of adjacent upstream and downstream signatures, the branch path being provided with a reciprocating shunting device as well as a withdrawing device having engaging belts, the method comprising the steps of:

leading the signatures around a bend so that the spine of each signature is caused to lift away from the engaging top surface of the preceding adjacent downstream signature to form a gap between the lifted spine and the top surface of the preceding adjacent downstream signature;

moving the shunting device into said gap whereby the lifted spine is deflected towards the withdrawing device and between the engaging belts;

moving the belts to draw the deflected signature between the engaging belts; and

rapidly withdrawing the shunting device away from said gap as the deflected signature moves between the engaging belts by means of a quick backward snatching of the withdrawing device while the extracted signature continues to move between the belts of the withdrawing device.

3,904,020

ROD COUNTER

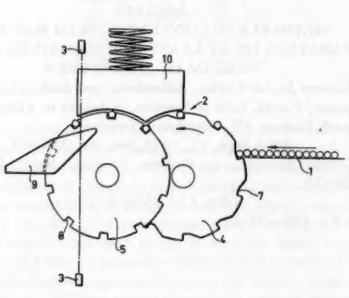
Arne Sven Bohlmark, Sundsvall, Sweden, assignor to Sunds Aktiebolag, Sundsvall, Sweden

Filed June 18, 1974, Ser. No. 480,358

Claims priority, application Sweden, July 13, 1973, 7309849

Int. Cl.[2] B65G *43/00*

U.S. Cl. 198—40 **5 Claims**



1. An apparatus for counting rod-shaped objects comprising a web for advancing objects, a separating device with which said web communicates to deliver objects thereto, and an indicating device (**3**) for indicating the number of objects passing through said separating device, wherein said separating device (**2**) comprises a feed wheel (**4**) and a counting wheel (**5**), which at their periphery are provided with gaps (**7, 8**) for receiving the objects, said wheels (**4, 5**) being located one after the other overlapping one another and adapted to be rotated in steps and alternatingly a distance corresponding to the distance between the gaps (**7, 8**) by a drive means (**6**) so as to transfer the objects in steps from a gap (**7**) in the feed wheel (**4**) to an empty gap (**8**) in the counting wheel (**5**), and a stripper (**10**) being located above and adjacent the feed and counting wheels.

3,904,021

RECEPTACLE FOR CONVEYING COINS

Earl O. Schweitzer, Wickliffe, Ohio, assignor to Ardac, Inc., Willoughby, Ohio

Filed Nov. 7, 1973, Ser. No. 413,429

Int. Cl.[2] B65G *47/14*

U.S. Cl. 198—53 **19 Claims**

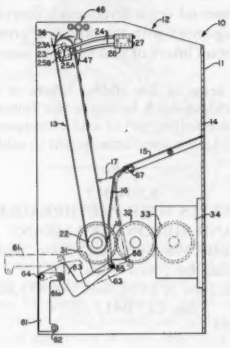
6. A receptacle for conveying multiple sized coins, comprising:

a hopper,

a conveyor means mounted in juxtaposition to said hopper for transporting the coin,

said conveyor means mounted about a roller located at the upper portion of said hopper,

said conveyor means having cleats attached thereto through the upper portion of said cleats such that the locus of said cleats about said roller are tangents, said cleats containing a tab depending therefrom,



said cleats having an outwardly extending bottom flange for holding coins,

said cleat flange having a varying lateral projection to hold coins of varying size, and

chute means at the bottom of said hopper adjacent to said conveyor for directing the coins in said conveyor means, and

said cleats diagonally spaced on said conveyor means so that multiple sized coins are continuously transported on a single basis.

3,904,022

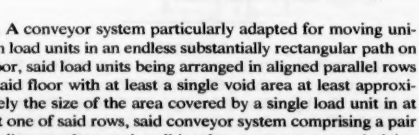
ARTICLE HANDLING SYSTEM

David E. Lutz, 330 Washington Ln., Carlisle, Pa. 17013

Division of Ser. No. 201,807, Nov. 24, 1971, Pat. No. 3,777,916. This application July 24, 1973, Ser. No. 382,059

Int. Cl. B65g *37/00*

U.S. Cl. 198—85 **6 Claims**



1. A conveyor system particularly adapted for moving uniform load units in an endless substantially rectangular path on a floor, said load units being arranged in aligned parallel rows on said floor with at least a single void area at least approximately the size of the area covered by a single load unit in at least one of said rows, said conveyor system comprising a pair of adjacent elongated walking beam conveyors underlying said rows, first and second drive means for actuating each of said walking beam conveyors to shift said units in said rows in longitudinal directions, a pair of transverse conveyor units at opposite ends of said rows and extending between adjacent ends of said walking beam conveyors, third and fourth drive means for actuating said pair of transverse conveyors to shift a load unit from one walking beam conveyor to the other, and control means for actuating said drive means in a predeter-

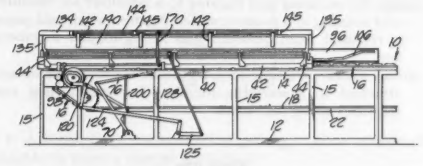
mined sequence utilizing said void area to shift said units intermittently in said continuous generally rectangular path over said floor.

3,904,023

APPARATUS TO ORGANIZE A MASS OF OBJECTS INTO A TRAVELLING ROW

Paul F. Paddock, Riverside, and Jerry W. Cramer, Upland, both of Calif., assignors to Sunkist Growers, Inc., Sherman Oaks, Calif.

Filed Oct. 10, 1972, Ser. No. 295,915
Int. Cl. B65g *37/00*
U.S. Cl. 198—106 **23 Claims**



1. In an apparatus to deliver objects sequentially to a zone, for example, a processing zone,

the combination of:

a continuously operating conveyor to move a single row of objects longitudinally of the row to said zone;

a reciprocating shuttle synchronized with the conveyor and making a stroke from a starting position in the direction of travel of the conveyor, which stroke accelerates to substantially the velocity of the conveyor;

cyclic holding means on the shuttle synchronized with the reciprocation of the shuttle to receive a row of the objects at the starting position of the shuttle and to release the row to the conveyor when the shuttle is accelerated to substantially the velocity of the conveyor;

cyclic supply means synchronized with the reciprocations of the shuttle to load the cyclic holding means on the shuttle at the starting positions of the shuttle;

a crank operatively connected to the shuttle to reciprocate the shuttle; and

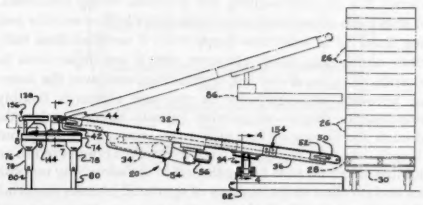
a continuously-actuated epicyclic train synchronized with the conveyor to move the crank in an epicycloidal orbit.

3,904,024

APPARATUS FOR TRANSFERRING OBJECTS

Frank L. Smith, Bowling Green, Ohio, assignor to Huss Equipment Corporation, Toledo, Ohio

Filed Jan. 21, 1974, Ser. No. 434,890
Int. Cl.² B65G *21/12*
U.S. Cl. 198—119 **12 Claims**



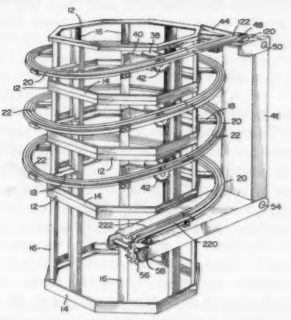
1. Apparatus for handling objects comprising an elongate conveyor, means at a first end of said conveyor for pivoting said conveyor about a vertical axis, means at said first end of said conveyor for pivoting said conveyor about a horizontal axis, a platform under said conveyor toward a second end thereof, means for raising and lowering said platform, a track carried by said platform and extending transversely of said elongate conveyor, roller means engaging said track, and upright means connecting said roller means and a portion of said conveyor toward the second end to enable movement of said second end along an arcuate path having its center on the vertical axis.

3,904,025

SPIRAL CONVEYOR

Francis J. Garvey, Conewall, N.J., assignor to Garvey Corporation, Blue Anchor, N.J.

Filed Nov. 23, 1973, Ser. No. 418,206
Int. Cl. B66b *9/12*
U.S. Cl. 198—136 **11 Claims**



1. A spiral conveyor comprising

a plurality of drive means spaced from each other,

idler means spaced from said plurality of drive means,

endless conveyor means having a driven portion engaging said plurality of drive means and a return portion engaging said idler means,

power means operatively connected to said plurality of drive means for simultaneously driving the same,

a plurality of modular frames, each modular frame of said plurality having upper and lower members, at least one of the upper and lower members of each modular frame being matched and aligned with at least one of the adjacent lower and upper members of an adjoining modular frame of said plurality whereby the plurality of modular frames of said conveyor are stacked in vertical and aligned relation to each other, and

spiral track means spaced outwardly of and about each modular frame of said plurality and extending between the upper and lower members of each modular frame of said plurality so as to form a single spiral loop, the adjacent ends of the spiral track means of adjoining modular frames of said plurality being disposed in aligned and abutting end-to-end relationship so as to form a continuous spiral conveyor between the spiral track means of said plurality of modular frames when the plurality of modular frames of said conveyor are stacked in vertical and aligned relation to each other, said track means for each modular frame of said plurality including means supporting the driven portion of said endless conveyor means.

3,904,026

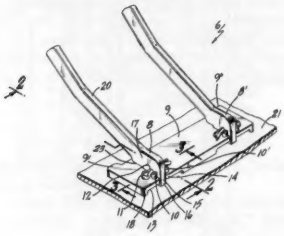
COMBINE TOOTH ASSEMBLY

Walter David Hofer, Box. No. 580, Pincher Creek, Alberta, Canada

Filed Nov. 21, 1973, Ser. No. 417,970
Int. Cl.² B65G *19/00*
U.S. Cl. 198—172 **10 Claims**

1. A combine detachable tooth device for mounting through an aperture of a combine tooth-mounting belt, comprising in combination: a combine tooth having a central shaft and

having a base flange extending transversely laterally to and unitarily continuous with the central shaft, the central shaft extending axially and being shaped to include a bend at a point intermediate of the shaft's axial length at a location spaced a predetermined distance from the base-flange such that when the shaft extends upwardly when mounted through the aperture of the combine tooth-mounting belt from an underside of the belt a major proportion of said predetermined distance remains between an upper face of the belt and said intermediate point, distally located from and in juxtaposition to and fixedly unitarily continuous with the intermediate point a shaft lower-face portion of the shaft being shaped to extend about horizontally while maintaining spacing at about said major proportion between the lower-face portion and the upper face of the combine tooth-mounting belt; a base-strip element



having upper and lower substantially flat faces about parallel to one-another defining through-space therethrough of a size and shape receivable of said shaft and further defining an open-ended slot of a width of a predetermined width distance substantially equal to and at least as great as a narrowest diameter of the shaft below and in juxtaposition with said intermediate point, and the base-strip element being insertable beneath the shaft lower-face portion within said distance of the major proportion with structure defining said open-ended slot extending on each of opposite sides of the shaft below the bend, the base-strip element and the combine tooth having interlocking structure securing the base-strip element in the inserted state, the combine tooth including at least one projection extending in a substantially vertical plane and positioned as an abutment preventing accidental withdrawal of the base-strip element from its inserted state.

3,904,027

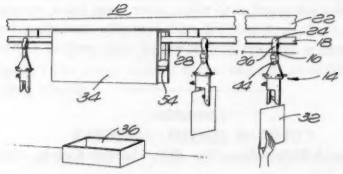
DOCUMENT DISTRIBUTION SYSTEM

John R. Gilles, 2420 Fourth Ave., Arcadia, Calif. 91006; William F. McFarland, 6650 Densmore, Van Nuys, Calif. 91408, and Jess W. Spears, 504 S. Marguerita, Alhambra, Calif. 91802

Filed Jan. 2, 1974, Ser. No. 430,275

Int. Cl.² B65G *17/00*

U.S. Cl. 198—180 **3 Claims**



1. A document distribution system comprising:

means for releasably securing a sheet of paper between a first spring-loaded member and a second spring-loaded member; said first spring-loaded member being connected to and simultaneously movable with a releasing mechanism for enabling said first spring-loaded member and said releasing mechanism to be pivotal about the same point on the housing;

said second spring-loaded member being movable about a second point on said housing, said first and second spring-loaded members being biased by a first and second spring, respectively, for biasing said spring loaded members at different tensions, said second spring-loaded member being biased by a spring whose tension is less than the tension of the spring biasing said first spring-loaded member for enabling said second spring-loaded member to pivot and separate from said first spring-loaded member by insertion of said paper between said spring-loaded members;

means for securing said housing to a stabilizer for retaining said housing in a predetermined position when said paper is released from between said spring-loaded members; and

trolley means pivotably secured to said stabilizer means and attached to a movable member for transporting said stabilizer along said track.

3,904,028

SLATTED CONVEYOR

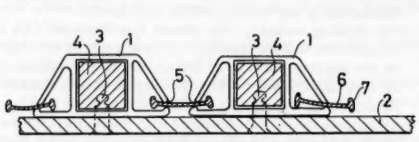
Hugo Stefan Müller, Elbinger Str. 6, 996 Nordlingen, Germany

Filed July 2, 1973, Ser. No. 375,847

Claims priority, application Germany, July 6, 1972, 2233063

Int. Cl.² B65G *15/42*

U.S. Cl. 198—195 **7 Claims**



4. A slatted conveyor having slats, such as of synthetic plastics material, for accommodating the products being conveyed, said slats each comprising a multi-chamber hollow section and being fixed on at least one support, such as an endless belt; further comprising cover elements which are impervious to the products being conveyed, which elements cover the interstice between adjacent slats by the said elements flexibly connecting the slats to one another laterally along their length; and each slat having on one side a slot extending throughout its length, into which engages a cover element connected to an adjoining slat, wherein the slats are slotted on both sides, and corrugated flexible profiled strips, such as of synthetic plastics material, serve as cover elements.

7. A slatted conveyor having slats, such as of synthetic plastics material, for accommodating the products being conveyed, said slats each comprising a multi-chamber hollow section and being fixed on at least one support, such as an endless belt; further comprising cover elements which are impervious to the products being conveyed, which elements cover the interstice between adjacent slats by the said elements flexibly connecting the slats to one another laterally along their length; and each slat having on one side a slot extending throughout its length, into which engages a cover element connected to an adjoining slat; said slats being slotted in the same way on both sides and profiled strips, such as of synthetic plastics material, and which are double-T shape, serve as cover elements; said cover elements being secured at their two ends against working out of the slats transversely of the conveying direction by one of the two associated slats being closed at the corresponding end of the slot; and for securing the cover elements, the respective slot only extends to shortly before the end of the slat, so that an unslotted marginal zone is still left on the respective side of the slat and closes the slot.

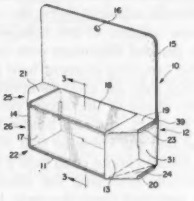
3,904,029
VISUAL DISPLAY PACKAGE

Irving Morton Koltz, Toronto, Canada, assignor to International Inpak Inc., Saddle Brook, N.J.

Continuation-in-part of Ser. No. 272,112, July 17, 1972, abandoned, which is a continuation-in-part of Ser. No. 160,806, July 4, 1972, abandoned. This application Oct. 5, 1973, Ser. No. 403,871

Int. Cl. B65d *25/54*

U.S. Cl. 206—45.34 **16 Claims**



1. A blank for a container comprising a piece of material foldable to form a carton, including:

a. a front panel having a predetermined width and height;

b. a back panel having a width greater than that of said front panel and a height at least equal to that of said front panel;

c. a top panel and bottom panel having a width equal to that of the front panel;

d. a pair of end closures, each of said end closures including an end panel foldable to a closed position inward of the side marginal edges of said back panel, and being foldable along a first fold line common to said front panel and said end panel; a closure flap having three free edges and reversely foldable over the inner exposed surface of said back panel along a second fold line common to said back panel and said closure flap, each of said top and bottom panels including at least one gusset panel extending between said top and bottom panels and an end panel, said closure flap being dimensioned such that when it is in its folded position, it physically engages an adjacent member and is thereby locked in place.

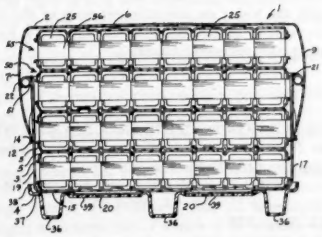
3,904,030
RETURNABLE PACKAGING SYSTEM

John M. Repp, Florissant, and Frank C. Brown, St. Charles, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed May 10, 1973, Ser. No. 359,209

Int. Cl.[2] B65D *85/68*

U.S. Cl. 206—319 **10 Claims**



1. A packaging system for shipping a plurality of motor parts comprising:

a pallet portion;

a bottom container mounted to said pallet portion, said bottom container being constructed from moisture impervious material, said bottom container including a bottom wall, a first pair of oppositely opposed side walls extending upwardly from said bottom wall, and a second pair of oppositely opposed side walls extending upwardly from said bottom wall;

a cover part of moisture impervious material interconnectable with said bottom container so as to define a chamber, said chamber having a size variable between at least a first size corresponding to a fully loaded condition of said packaging system and a second size corresponding to an unloaded condition of said packaging system, said second size being substantially smaller than said first size, said cover part including a top wall, a first pair of oppositely opposed downwardly extending walls integrally formed with said top wall, a second pair of oppositely opposed downwardly extending walls integrally formed with said top wall, said first and said second pairs of downwardly extending walls being joined to one another and to said top wall at a first end of adjacent ones of said pairs, said first and said second pairs of downwardly extending walls having relief formed in them at a second end of adjacent ones of said pairs;

a plurality of layers of motor parts, the height of said layers being greater than the height of said bottom container in said first size of said chamber, each of said layers comprising a first tray having a plurality of receptacles formed in it for supportingly receiving a first end of respective ones of said motor parts, a plurality of motor parts carried along said receptacles, and a second tray having a plurality of receptacles in it for receiving a second end of respective ones of said motor parts, the edges of trays of the said layers within said bottom container abutting at least a portion of said first and said second pairs of oppostely opposed side walls of said bottom container, thereby restricting horizontal movement of said layers within said bottom container, the uppermost tray of said layer plurality in said first size of said chamber abutting said cover part, thereby restricting vertical movement of said trays; moisture impervious sealing means between said cover part and said bottom container, said sealing means being releasably inflatable between at least a first position and a second position; and

means for drawing the oppositely opposed walls of said cover part against said sealing means, said relief means permitting the oppositely opposed walls of said cover part to be drawn against said sealing means while the top wall remains in abuttment with the uppermost tray of said layer plurality in the first size of said chamber.

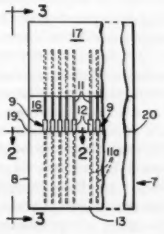
3,904,031
ELECTRIC COMPONENT PACKAGE

William R. Kessler, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed June 20, 1973, Ser. No. 371,898

Int. Cl.[2] B65D *85/42*

U.S. Cl. 206—328 **4 Claims**



1. In a package for electric components each comprising a body of a selected planar configuration in a plane normal to the length of each respective component, and a terminal lead

extending axially from each end thereof, such package including a strip of corrugated paper board having a corrugated paper sandwiched between upper and lower paper sheets with the crests of the corrugations adhered to the upper and lower paper sheets, said corrugated paper and paper sheets having a width greater than the length of each of said leads with the corrugations of the corrugated paper extending across said width and each corrugation having transverse dimensions intermediate the transverse dimensions of the bodies and leads of said components, the modification comprising;

I. a resilient first strip of stiff paper generally equal in length to said strip of corrugated paper board and having an upper surface adhered to the lower surface of said lower paper sheet with corresponding ends of said strips in general alignment, a portion of such resilient strip extending for a distance beyond the end of the exposed terminal lead of each electric component having its opposite terminal lead fully disposed in one of said corrugations; and

II. a resilient second strip of stiff paper generally equal in length to said portion of said resilient first strip and integrally joining therewith along the upper surface thereof with corresponding ends of such resilient strips in general alignment, said resilient second strip extending a distance above the exposed terminal lead towards but short of the body of each said electric component having its opposite terminal lead fully disposed in one of said corrugations to provide a manually movable cover flap for normally restricting movement of each respective electrical component from said package.

3,904,032

HOLDER STRIP FOR FEEDING FASTENING ELEMENTS INTO A SETTING DEVICE

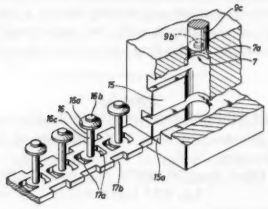
Elmar Maier, Feldkirch-Tisis, Austria, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Continuation of Ser. No. 174,846, Aug. 25, 1971, abandoned. This application Apr. 30, 1973, Ser. No. 355,660

Claims priority, application Germany, Aug. 28, 1970, 2042768

Int. Cl. B65d *83/00*

U.S. Cl. 206—347 **4 Claims**



1. A holder assembly for supplying fastening elements into the barrel of a setting device so that the fastening elements can be driven into a target material by means of a piston driven by an explosive force developed within the setting device, the holder assembly includes a flat elongated strip having a plurality of holes therethrough spaced apart in the elongated direction of said strip and a fastening element positioned within each hole, each said fastening element includes an elongated shank having a first end and a second end with the first end arranged to be inserted first into the target material and a head extending transversely laterally outwardly from the circumferential periphery of the shank at the second end thereof, wherein the improvement comprises that the shank of each said fastening element is secured within one of the holes in said holder strip adjacent the first end thereof and spaced for a considerable axial length of the shank from its second end so that the head of the fastening element is spaced from said holder strip, said holder strip having a width greater than the diameter of the heads of said fastening elements so that the sides of the strip extend laterally outwardly beyond the lateral periphery of the heads, said holder strip is perforated adjacent to and on opposite sides of each hole so that the perforations are spaced radially outwardly from the hole and inwardly from the sides of the strip and in angularly spaced relation to one another about the hole with which they are associated and said perforations for each hole are separate from and spaced in the elongated direction of said strip from the perforations for the adjacent holes with a portion of said strip extending transversely of the elongated direction thereof and located between the perforations about adjacent holes, the radially inner edges of the perforations relative to the hole with which they are associated are in general alignment with the lateral periphery of the head of the fastening element held in the hole and the radially inner edge has an arcuate configuration generally conforming to the shape of the lateral periphery of the head of the fastening element, and said holder strip is formed of a selected material and thickness so that in combination with the perforations formed about each hole a washer-like portion of said strip laterally enclosing the shank of the fastening element can be punched from the strip by the head of the fastening element as it is driven into the target material by the explosive force driven piston in the setting device with the perforations assisting in the punching out of the washer-like portion.

3,904,033

PICK-GUARD

Raymond H. Haerr, Cincinnati, Ohio, assignor to Xomox Corporation, Cincinnati, Ohio

Filed Nov. 8, 1974, Ser. No. 522,120

Int. Cl.[2] **B26B** *29/00;* **B65D** *85/54*

U.S. Cl. 206—349 **7 Claims**

1. A one-piece, plastic pick-guard for shielding the tip of a medical pick or the like, comprising a pair of elongate jaws integrally hinged together at one of their ends for pivotal movement between open and closed positions, one of said jaws having a pair of transversely aligned, laterally spaced upstanding latches, the other jaw having a pair of transversely aligned, laterally spaced, latch-receptive openings therethrough, a transverse latch strike on the said other jaw at one side of and spanning each of said latch-receptive openings, and a deformable, resilient pad secured to and carried by said first mentioned jaw, adjacent and in circumscribing relationship with the lower or jaw-adjacent ends of the latches, said laterally spaced latches defining the sides of a longitudinally extending pick-receptive channel.

3,904,034

HOLDER FOR SOCKETS OF A SOCKET WRENCH

Ronald Saunders, Lower Nicola, Canada, assignor to Mo Clamp Co. Ltd., Delta, Canada

Filed June 24, 1974, Ser. No. 482,756

Int. Cl. B65d *85/54*

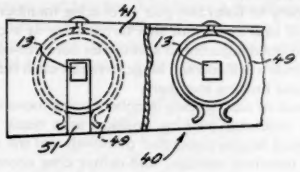
U.S. Cl. 206—378 **5 Claims**

1. A holder for sockets of a socket wrench combination comprising:

a. a housing having a pair of spaced apart top and bottom walls,

b. a row of U-spring clips mounted in the housing for releaseably holding a row of sockets in a side by side relationship with ends of the sockets confronting the top and bottom walls,

c. an opening in the housing for enabling the sockets individually and selectively to be inserted in and removed from the spring clips,



d. the top wall having a slot formed therein over each of the spring clips and opening out of the opening and being sufficiently wide to enable the drive shank of the wrench of the combination to be extended therethrough into any of the sockets so that the sockets can be removed from and replaced in the holder with the wrench alone.

3,904,035

RECEPTACLE WITH HINGED CLOSURE FLAPS

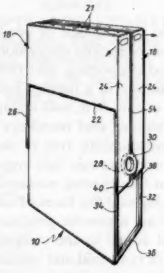
Reinhold Metzler, Heidenheim, and Georg Knoblauch, Giengen, both of Germany, assignors to Georg Knoblauch Werkzeugkassetten-fabrik, Giengen, Germany

Filed Oct. 12, 1973, Ser. No. 406,180

Claims priority, application Germany, Oct. 28, 1972, 7239688

Int. Cl.² B65D *43/20, 51/18, 85/24*

U.S. Cl. 206—379 **14 Claims**



1. A receptacle for storing elongated articles such as drills, thread taps or the like, comprising

a. a rectangular container (**10**) having a bottom wall and vertical pairs of side and end walls, respectively, the top portion of said container containing at least one article-receiving opening;

b. closure means for closing the container opening, comprising

1. a pair of normally-closed opposed tray-shaped closure flaps (**16, 18**) each having a pair of side walls (**24, 26**) adjacent the upper portions of the end walls of said container, respectively; and

2. hinge means (**28, 30**) pivotally connecting the lower ends of the side walls of said closure flaps, each of said hinge means comprising a pair of telescopically arranged members one of which is an annular receiving portion (**28**) and the other of which is a cylindrical bearing portion (**30**); and

c. guide means (**32, 34**) connecting said hinge means for vertical movement relative to the end walls of said container, respectively, whereby upon pivoting of the closure flaps apart to an open position relative to the container, said hinge means and said closure flaps are downwardly displaceable to a retracted position in which the closure flaps are locked open and the container is housed substantially completely within the closure flaps.

3,904,036

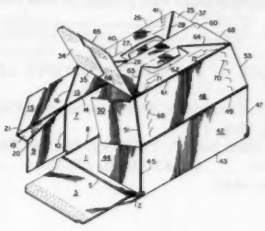
FULLY ENCLOSED BOTTLE CONTAINER

Homer W. Forrer, Jonesboro, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Nov. 15, 1974, Ser. No. 524,144

Int. Cl.² B65D *65/12, 65/14, 65/28, 75/08*

U.S. Cl. 206—427 **15 Claims**



1. A bottle container comprising top, bottom, and side walls, each side wall having a bottom portion, and an inwardly tapered top shoulder portion said top and bottom walls and said wall portions being interconnected to form a tubular structure, a transverse lower end flap foldably joined to each end edge of the bottom portion of each side wall, a transverse upper end flap foldably joined to each end edge of the shoulder portion of each side wall, web structure interconnecting each lower end flap and the associated upper end flap and disposed in flat face contacting relation therewith, a top end panel foldably joined to each end edge of said top wall and folded downwardly and secured in flat face contacting relation with at least one transverse end flap on each side of each end of the container, and a bottom end panel foldably joined to each end edge of said bottom wall and folded upwardly and secured to said top end panel.

3,904,037

STORAGE UNITS

Richard R. Alter, 608 McDowell St., Delavan, Wis. 53115

Continuation-in-part of Ser. No. 275,516, July 27, 1972, abandoned. This application May 10, 1973, Ser. No. 359,101

Int. Cl.² B65D *85/42*

U.S. Cl. 206—534 **11 Claims**

1. A storage unit for storingly supporting and dispensing articles, and comprising

a. an elongated housing having

1. a tubular side wall, and

2. an open end, and

b. an elongated, substantially straight, one-piece member

1. mounted in said housing in substantially coaxial relation thereto and with a frictional fit relative thereto, and

2. longitudinally reciprocable in said housing through said open end,

c. said member including

1. an elongated body portion extending longitudinally of said housing, and

2. an abutment member

a. on the end of said body portion remote from said open end, and

b. extending transversely to the length of said housing for underlyingly supporting such an article in said

housing on the side of said abutment member facing said open end,

d. said body portion having a portion for laterally supporting such an article so supported on said abutment member, and

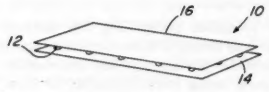
e. said body portion having a sufficiently narrow maximum width, at said portion thereof, for permitting such a so supported article to be grippingly engaged between members disposed at opposite lateral sides of said portion of said body portion and lifted by said last mentioned members from said elongated member in a direction extending laterally away from said portion of said body portion.

3,904,038

PACKAGE OF PRESSURE SENSITIVE ADHESIVE DROPLETS

David Lester, Cambridge, Mass., assignor to Polymerics, Inc., Waltham, Mass.

Filed June 7, 1973, Ser. No. 367,743
Int. Cl.[2] B65D *85/70*
U.S. Cl. 206—447 **5 Claims**



1. A package comprising:

a. a sheet of release material; and

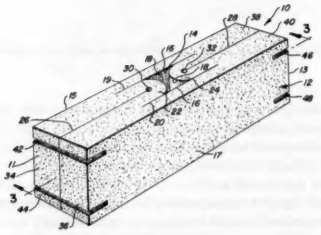
b. a plurality of droplets of a pressure sensitive material distributed over the surface of said sheet and lightly adherent thereto, said droplets having a tack level that is sufficiently high to provide good adhesion to common surfaces and that is sufficiently low to be readily removed from said sheet by a user without sticking to the fingers of the user.

3,904,039

WASHING MACHINE PACKING BRACE

Norman Raymond Anyon, Wilkinsonville, Mass., assignor to Republic Packaging Corporation, Chicago, Ill.

Filed June 26, 1974, Ser. No. 483,148
Int. Cl. B65d *85/06*
U.S. Cl. 206—320 **5 Claims**



1. A packing brace for a washing machine assembly having a rotatable agitator positioned within the washing drum, comprising,

a single unitary block of resilient material, said block having a length dimensionally greater than the width and height thereof and having opposed sides and ends,

said block provided with a center core cut-out,

said center core cut-out bounded by opposed straight side edges and opposed oppositely disposed forward and rear arcuate walls,

each of said straight side edges bounding said center core cut-out being co-extensive with lateral slits,

said block further provided with a pair of central slits extending mid-width along the length thereof from each end to a point spaced inwardly from said center core cut-out, thereby to form two pair of bracing members,

each of said mid-width slits terminating at a circular core positioned adjacent to said center core cut-out thereby to provide a self-formed hinge between each respective pair of said bracing members,

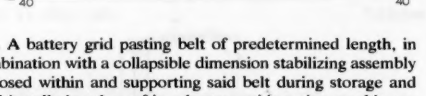
and each of said bracing members being movable to a laterally extended packing position as a result of the self-formed hinges associated therewith and the resiliency of the material, whereby said center core accomodates the agitator head of a washing machine and each of said bracing members may be moved laterally to frictionally engage the interior side walls of the washing machine drum, thereby to firmly engage and restrain the agitator from movement.

3,904,040

STABILIZING MEANS FOR A BATTERY GRID PASTING BELT

Robert O. Gilbert, R.D. No. 2, Gettysburg, Pa. 17325

Filed June 6, 1974, Ser. No. 477,057
Int. Cl.[2] B65D *85/16;* **B65H** *75/06*
U.S. Cl. 206—493 **4 Claims**



1. A battery grid pasting belt of predetermined length, in combination with a collapsible dimension stabilizing assembly disposed within and supporting said belt during storage and until installation thereof in a battery grid pasting machine to prevent shrinkage of said belt, said collapsible assembly comprising a pair of similar end members each having a belt-engaging surface substantially free of sharp edges and a substantially flat face opposite said belt-engaging surface thereof, and elongated strut-like spacing means removably positioned between and abutting said flat faces of said end members, said spacing means having a precise predetermined length which when doubled and added to the circumference of said belt-engaging surfaces of both said end members is precisely equal to the length of said pasting belt required for installation on a battery grid pasting machine, whereby said stabilizing assembly maintains said pre-determined length of said belt and enables the same to be installed upon a pasting machine without alteration of the belt to effect such installation.

3,904,041

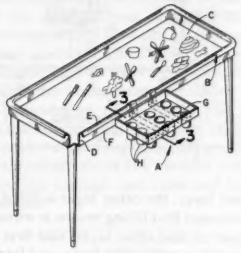
COMMERCIAL KITCHEN RACK STRUCTURE

Irving Medgebow, Tampa, Fla., assignor to Jackson Products Company, Tampa, Fla.

Filed Feb. 15, 1974, Ser. No. 442,837
Int. Cl.[2] A47G *29/00*
U.S. Cl. 211—72 **9 Claims**

7. A rack mountable on an edge rail of a support member comprising, a pair of spaced apart generally parallel planar sidewalls and spaced apart generally parallel planar front and rear walls, said walls having top and bottom edges and being defined by a unitary strip of stainless steel, and a pair of bracket strips, each bracket strip being defined by a unitary strip of stainless steel and including a bottom portion extending between said front and rear walls adjacent the bottom edges thereof, an upwardly extending front flange fastened in facial engagement with said front wall, a mounting portion adapted to receive said edge rail, said mounting portion including an upwardly extending rear flange fastened in facial

engagement with said rear wall, a terminal section spaced rearwardly from said rear flange and a bridging portion extending between said rear flange and terminal section, said terminal section having a bottom edge spaced below said bridging portion, said bracket strips being generally parallel to one another and to said sidewalls and being spaced apart from one another and from the adjacent one of said sidewalls to define parallel longitudinally coextensive and uninterrupted



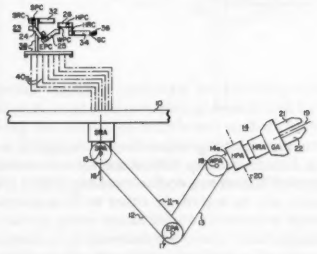
openings between said front and rear walls, each of said bracket strips having a width and each of said openings having a width laterally of said sidewalls greater than said width of said bracket strips, said bridging portion being semi-circular and said bottom edge of said terminal section being spaced below a horizontal diametrical line across the opposite ends of said bridging portion, and a positionally fixed abutment strip rigidly fastened to the bottom portion of each of said bracket strips and projecting rearwardly of said rear wall.

3,904,042

MANIPULATOR APPARATUS

John R. Colston, Annapolis, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 25, 1974, Ser. No. 445,752
Int. Cl.[2] B25J *3/00*
U.S. Cl. 214—1 CM **6 Claims**



1. Manipulator apparatus comprising,

a configuration-adjustable work arm having parts interconnected by joints permitting gross relative movment while maintaining the same relative movement relationships in all relative arm part positions,

respective power actuators for such arm joints,

a hand-operated single-configuration controller having parts corresponding to and arranged similar to the aforesaid work arm parts, with limited-movement joints biased toward neutral positions and interconnecting such parts to permit limited angular movement from such neutral positions in the same directions as those of the corresponding joints in said work arm, and

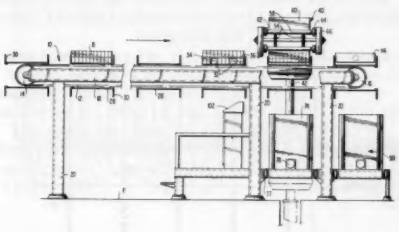
control means including means responsive to the limited angular movement of the controller joints to effect operation of the aforesaid power actuators in the arm joints, respectively.

3,904,043

APPARATUS FOR HANDLING AND STACKING BRICKS

Robert E. Jones, 15 S. Oak Forest Dr., Asheville, N.C. 28803

Division of Ser. No. 153,577, June 16, 1971, Pat. No. 3,738,514. This application Mar. 13, 1973, Ser. No. 340,779
Int. Cl.[2] B65G *57/10, 57/20*
U.S. Cl. 214—6 A **2 Claims**

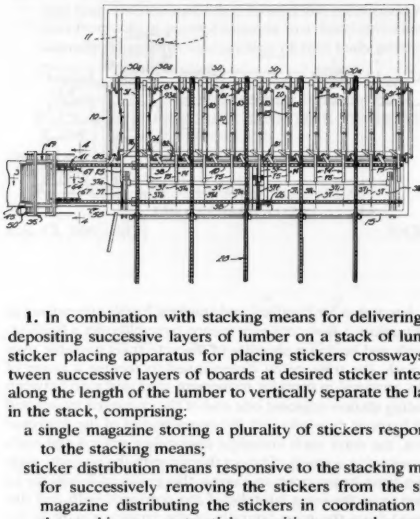


1. Apparatus for handling and stacking bricks comprising in combination: a first conveyor means movable over a horizontal path and having a plurality of discrete trays movable over said path, the trays being dimensioned to receive a group of bricks arranged in rows for movement over said path between a loading station adjacent one end of the conveyor means and a discharge station adjacent the opposite end of the conveyor means, the trays each including upstanding spaced end walls for containing a group of bricks therein with the opposite ends of the trays being open to permit the group of bricks to be loaded onto the trays laterally of the conveyor path and discharged from the trays laterally of the conveyor path at the loading and discharge stations respectively, the distance between said end walls of each tray being sufficient to accommodate a plurality of rows of bricks extending transversely of the conveyor path with the bricks in each rows being in end-to-end abutting relationship and including at least two bricks in each row, and the height of said tray end walls being sufficient to accommodate at least two layers of multi-row bricks, pusher means transversely movable over the conveyor path and through the trays only at the discharge station for engaging an entire group of bricks in the trays and for pushing the same laterally off the conveyor path at the discharge station, said pusher means having a length slightly less than the distance between opposite end walls of each tray, a single movable temporary support plate positioned in a horizontal plane at one side of the conveyor path at the discharge station to receive groups of bricks discharged from the trays by said pusher means, a vertical elevator means positioned below said temporary support plate for receiving groups of bricks from the temporary support plate to form a stack of bricks on the elevator means, means for lowering the elevator means for permitting the temporary support plate to be moved to a first position for receiving bricks from said first conveyor means and for then raising the elevator means to a position closely adjacent the underside of said temporary support plate soon after the temporary plate is moved to said first position thereof to ready the elevator means for receiving a group of bricks from said support plate upon movement of the support plate to a second position for depositing bricks by gravity on the elevator means, and means for moving the temporary support plate only in a horizontal plane and generally at right angles to the conveyor path between said first and second positions thereof, a shuttle car for receiving a stack of bricks from the elevator means, and means for pushing a stack of bricks from the elevator means onto the shuttle car, said shuttle car being movable parallel to the conveyor path below the plane of said temporary support plate between a first position for receiving bricks from the elevator means and a second position for moving the bricks to a further processing station.

3,904,044
STICKER PLACEMENT DEVICE FOR LUMBER STACKING APPARATUS

Sidney L. Lunden, Spokane, Wash., assignor to Moore-Iem, Inc., Spokane, Wash.

Filed July 26, 1973, Ser. No. 382,740
Int. Cl.[2] B65G 57/26
U.S. Cl. 214—6 M 20 Claims



1. In combination with stacking means for delivering and depositing successive layers of lumber on a stack of lumber; sticker placing apparatus for placing stickers crossways between successive layers of boards at desired sticker intervals along the length of the lumber to vertically separate the layers in the stack, comprising:

a single magazine storing a plurality of stickers responsive to the stacking means;

sticker distribution means responsive to the stacking means for successively removing the stickers from the single magazine distributing the stickers in coordination with the stacking means to sticker positions spaced according to the desired sticker intervals; said sticker distribution means comprising;

an elongated endless indexing conveyor extending substantially parallel with the lumber between spaced sticker unloading stations corresponding in number and spacing to the sticker positions, in which the indexing conveyor has a sticker receiving end;

and indexing conveyor loading means for depositing a set of stickers equal to the number of sticker positions crosswise on the receiving end of the indexing conveyor during each cycle of operation of the stacking means of placing a layer of boards on the stack, in which the stickers are deposited on the indexing conveyor with the center-to-center distance between adjacent stickers of the set being less than the spacing between adjacent sticker positions; and

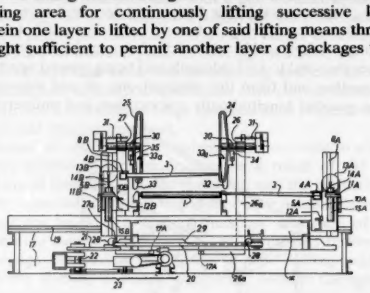
indexing drive means operatively connected to the indexing conveyor for intermittently driving the conveyor forward an incremental distance related to the spacing between the stacking positions during each cycle of operating of the stacking means to incrementally and progressively move the set of stickers sequentially from the receiving end of the conveyor to downstream unloading stations during successive cycles of operation.

3,904,045
MACHINE FOR LOADING PACKAGES ON A PALLET

Jacques Gabriel Auguste Thibault, 35, rue Robert Legeay, Creteil, Val-de-Marne, France

Filed Dec. 26, 1973, Ser. No. 428,065
Claims priority, application France, Dec. 27, 1972, 72.46505
Int. Cl. B65g 57/30
U.S. Cl. 214—6 BA 8 Claims

1. A machine for loading packages on a pallet, of the kind in which the successive layers of packages are introduced from the bottom, characterized in that it comprises, in combination, and area for stacking the packages in layers and having parallel rollers, means for bringing the packages onto the said area, two lifting means facing each other on each side of said stacking area for continuously lifting successive layers wherein one layer is lifted by one of said lifting means through a height sufficient to permit another layer of packages to be

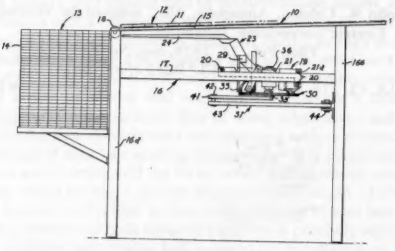


slid under the first layer, the other layer is lifted by the other lifting means when said first lifting means is withdrawn depositing said first layer on said other layer, said first lifting means then returning to lift a successive layer and lateral retention means for stripping the layer off each of the lifting means as the lifting means is withdrawn.

3,904,046
LUMBER STACKING APPARATUS

Sidney L. Lunden, Spokane, Wash., assignor to Moore-Iem, Inc., Spokane, Wash.

Filed Aug. 16, 1974, Ser. No. 497,909
Int. Cl.[2] B65G 57/10
U.S. Cl. 214—6 DK 12 Claims



1. A lumber stacking apparatus for receiving a course of boards at a course pickup station and for successively moving the courses of boards to a course stacking station and stacking the courses one on top of the other to form a lumber stack, comprising:

a. a frame;

b. a carriage movably mounted on the frame for reciprocating in a horizontal direction between the courses pickup station and the course stacking station;

c. course support means mounted on the carriage for reciprocating movement with the carriage and for up and down movement relative to the carriage;

d. drive means operatively connected to the carriage, frame, and course support means for: (1) moving the course support means relative to the carriage to an elevated position at the course pickup station to pick up a course of boards; (2) moving the carriage from the course pickup station to the course stacking station while maintaining the support means in the elevated position to carry the course to the course stacking station; (3) moving the course support means downward at the course stacking station to lower the course; and (4) moving the carriage from the stacking station to the pickup station to prepare for a subsequent course of boards; said drive means comprising:

e. a crankshaft supported for rotation about a vertical crankshaft axis;

f. drive crank means operatively connecting the crnakshaft, the frame and the carriage, and movable in a substantially horizontal plane for reciprocating the carriage in a translational path;

g. a cam follower operatively connected to the course support means;

h. cam means operatively connected to the crankshaft for engaging the cam follower as the crankshaft is being rotated to sequentially raise the course support means to the elevated position at the course pickup station, maintain the course support means elevated as the carriage is moved from the course support station to the course stacking station, and finally lower the course support means at the course support station; and

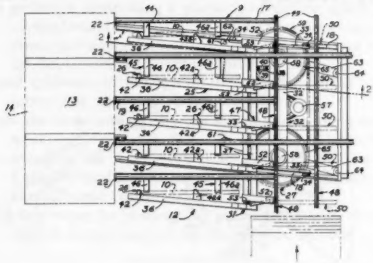
i. a motor operatively connected to the crankshaft for rotating the crankshaft about the vertical crankshaft axis to reciprocate the carriage and raise and lower the course support means.

3,904,047

LUMBER STACKING APPARATUS

Sidney L. Lunden, Spokane, Wash., assignor to Moore-Iem, Inc., Spokane, Wash.

Filed Aug. 16, 1974, Ser. No. 497,913
Int. Cl.[2] B65G *57/26*
U.S. Cl. 214—6 M **12 Claims**



1. A lumber stacking apparatus for receiving courses of boards and stickers at a course pickup station and for successively moving the courses of boards and stickers forwardly to a course stacking station and stacking the courses one on top of the other to form a stack with stickers placed crossways between the courses to vertically separate the courses in the stack, comprising:

a frame having guide tracks thereon extending between the course pickup station and the course stacking station an an oblique angle with respect to the longitudinal orientation of the boards in the stack;

course support means movably mounted on said tracks;

drive means operatively connecting the course support means and frame for moving the course support means to (a) engage and lift a course of boards at the pickup station, (b) move the course of boards forwardly and laterally along an oblique forward path while maintaining the course in the elevated condition, (c) lowering the course toward the stack at the stacking station, and (d) move rearwardly and laterally in an oblique rearward path from the course stacking station to the course pickup station in preparation for a successive course;

sticker support means responsive to movement of said course support means for supporting stickers crossways, relative to the lengths of boards in the course, beneath the engaged course as the course support means is moved from the pickup station to the stacking station along said oblique forward path; and

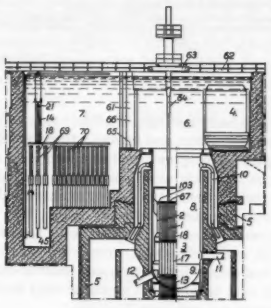
stripping means on the framework at said course stacking station projecting into the oblique rearward path of the stickers as the course support means is moved rearwardly and laterally for engaging and stripping the stickers and course from the sticker support means and course support means respectively onto the stack.

3,904,048

DEVICE FOR REFUELING A NUCLEAR REACTOR HAVING A CORE COMPRISING A PLURALITY OF FUEL ASSEMBLIES

Aart Van Santen, Vasteras, and Kjell Elofsson, Handen, both of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Division of Ser. No. 881,111, Dec. 1, 1969, Pat. No. 3,733,250.
This application Sept. 20, 1971, Ser. No. 182,171
Claims priority, application Sweden, Dec. 2, 1968, 16408/68
Int. Cl. G21c *19/20*
U.S. Cl. 214—27 **14 Claims**



1. In a device for refuelling a nuclear reactor having a core comprising a plurality of fuel assemblies, each of which comprises a multitude of parallel fuel rods arranged in a predetermined lattice, all the fuel rods being freely extractable and insertable at one end of the fuel assembly, a tool for extracting and inserting a number of the freely extractable and insertable fuel rods, comprising:

a tool body;

a number of gripping members attached to the tool body in positions corresponding to the lattice positions of the fuel rods to be extracted; means for urging the gripping members to grip and to release the fuel rods;

the tool body comprising:

a transverse and with respect to the fuel rods axially movable carrier member having a multitude of connection points for the gripping members, the connection points being arranged in a predetermined lattice identical to the fuel rod lattice; and

guide means attached to the transverse carrier member for guiding the gripping members at least substantially coaxially with the respective fuel rods; the tool having a multitude of said gripping members, of which a number corresponding to the number of fuel rods to be extracted at a given occasion are removably attached to the transverse carrier member at the connection points;

each gripping member comprising at least two cooperating gripping jaw members movable into and out of engagement with a shoulder facing the fuel rod at least partially; the grip and release urging means comprising means for moving the gripping jaw members into engagement with the shoulder and means for moving the gripping jaw members out of engagement with the shoulder, whereby the tool can extract and insert an arbitrary number of fuel rods arranged in arbitrary fuel rod positions in the fuel rod lattice of the assembly;

the guide means comprising:

a plurality of guide rods rigidly attached to the transverse carrier member, each guide rod sliding in a tube parallel with the fuel rods guided by the inner surface of the tube during a fuel rod manipulation operation.

3,904,049

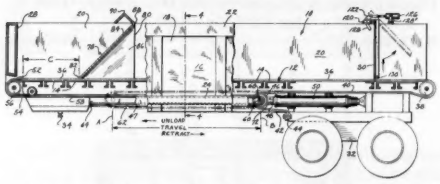
SELF-UNLOADING VEHICLE WITH TAILGATE OPERATING MECHANISM

Eugene D. Prahst, Franklin, Wis., assignor to The Heil Co., Milwaukee, Wis.

Division of Ser. No. 392,902, Aug. 30, 1973. This application May 1, 1974, Ser. No. 465,961

Int. Cl.[2] B60P *1/00;* **B62D** *33/00*

U.S. Cl. 214—83.34 **8 Claims**



1. In a vehicle body having a floor and side walls extending upwardly from said floor, and having a transversely-extending tailgate, tailgate opening mechanism comprising a shaft journalled between said side walls adjacent to the upper edge of said tailgate, belk cranks each having an intermediate portion rigidly connected to said shaft and having first and second arms, the upper edge of said tailgate being loosely pivoted to said first arms, and said second arms being positioned to kick the tailgate, and means for rocking said shaft to cause said first arms to raise said tailgate and to cause said second arms to kick said tailgate toward open position.

3,904,050

AUTOMATIC APPARATUS FOR SUPPLYING LAPS TO A GROUP OF COMBERS

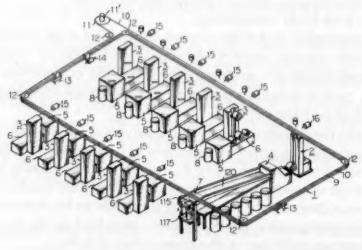
Hiroyasu Kimura, and Toshiharu Ueda, both of Yokkaichi, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed July 17, 1974, Ser. No. 489,429

Claims priority, application Japan, July 20, 1973, 48-80676

Int. Cl. D01b *3/04*

U.S. Cl. 214—89 **6 Claims**



1. In an automatic apparatus for supplying laps from at least one lap forming machine to lap stands of a group of combers by means of an overhead conveyer provided with a plurality of lap carriers and bare bobbin carriers, an improvement comprising in combination:

a. a lap transfer system comprising, a lap lifting device for lifting a lap received from said lap forming machine to a position for transferring said lap to a lap carrier, a first detector for detecting the arrival of a lap carrier not holding a lap, and an actuating means for enabling said lap carrier to receive a lap from said lap lifting device after receipt of an actuation signal from said detector;

b. a lap supply system comprising, a second detector for detecting the arrival of a lap carrier holding a lap, an actuator means for enabling said lap carrier to drop said lap, lap supporting means for receiving said lap dropped from said lap carrier, and means for displacing said lap supporting means to a waiting position to receive said lap from said lap carrier and for displacing said lap supporting means to an adjacent upper position above said lap stand and for opening said supporting means during downward displacement thereof at the terminal zone of said downward displacement so that said lap is dropped to said lap stand;

c. means for automatically controlling the sequential operation between said lap lifting device and lap carriers, and between said lap supporting means and lap carriers.

3,904,051

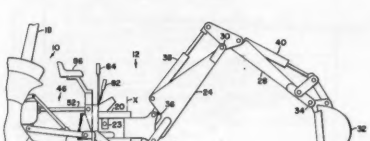
SAFETY DEVICE FOR PREVENTING UNDESIRED MOVEMENT OF THREE-POINT HITCH-MOUNTED BACKHOE FRAME

William Sadayuki Tsuchiya, East Moline, Ill., and Bradley Joseph Schnittjer, Delhi, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Dec. 20, 1974, Ser. No. 534,690

Int. Cl.[2] E02F *3/16*

U.S. Cl. 214—138 R **9 Claims**

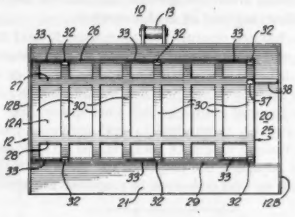


1. In a combination including a backhoe having a main frame attached to a tractor by vertically swingable linkage means for guiding the main frame upwardly and toward the tractor from a normal operating position to a transport position, an operator's seat supported on the main frame, a source of fluid pressure and a reservoir mounted on one of the main frame and tractor and coupled to control valve means mounted on the main frame, the control valve means being operable to selectively actuate various hydraulic actuators of the backhoe, a safety device for preventing the main frame from being moved into close proximity to the tractor by actuation of said hydraulic actuators during operation of the backhoe, comprising: a normally closed dump valve means connected between the source of fluid pressure and the reservoir and including a shiftable means which is actuatable to connect the source of fluid pressure to the reservoir so as to disable said actuators; a sensing means connected between the main frame and link means for sensing the position of the main frame relative to the tractor; and position responsive means connected between the sensing means and the shiftable means for actuating the latter to effect an open condition in said dump valve means in response to the main frame moving to a predetermined position relative to the tractor during operation of the backhoe.

3,904,052
MATERIAL HANDLING BUCKET

Lloyd Nordstrom, Belle Fourche, S. Dak., assignor to American Colloid Company, Skokie, Ill.

Filed Feb. 28, 1974, Ser. No. 446,623
Int. Cl.[2] E02F 3/81
U.S. Cl. 214—146 E 6 Claims



1. A material handling lift bucket for attachment to a tractor having means to raise and lower the bucket and means to tilt the bucket for loading, raising, and dumping the contents thereof, said bucket comprising:

a horizontally elongated bucket body having a laterally extending generally concave interior surface closed at its ends to define a bucket cavity;

hinge means on said bucket body adapting said bucket for attachment to a tractor;

a gridwork comprising a plurality of spaced apart parallel vertical members having a contour complimentary to said concave interior surface and mounted for lateral horizontal displacement in contact with said surface;

said gridwork including one or more horizontal members interconnecting said vertical members;

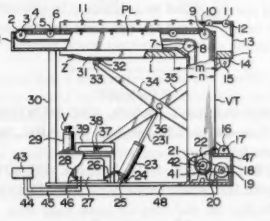
pin and slot connector means for interconnecting said gridwork and bucket body at a plurality of spaced apart locations for supporting said gridwork for reciprocal limited lateral horizontal movement on said bucket body between said closed ends;

pusher means for pushing said gridwork laterally to one side of said bucket body along said surface thereof.

3,904,053
ENGAGE-DISENGAGE DEVICE FOR CARGO-TRANSFER MEANS IN MECHANICAL CARGO HANDLING SYSTEM OF THE LOAD REPLACING TYPE

Shukuro Yatagai, Kitakyushu, and Katunori Tamura, Kitakyushi, both of Japan, assignors to Japanese National Railways, Tokyo, Japan

Filed Nov. 6, 1973, Ser. No. 413,389
Claims priority, application Japan, Nov. 16, 1972, 47-131170
Int. Cl.[2] B65G 65/40
U.S. Cl. 214—310 5 Claims



1. An engage-disengage device for a cargo-transfer means having a plurality of parallel tines in a mechanical cargo handling system of the load-replacing type characterized in that the device comprises:

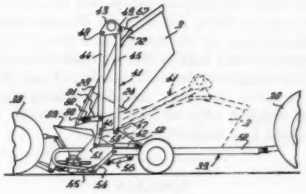
a. a fixed frame including rows of cargo-transport means arranged in parallel and spaced apart at a distance greater than the width of said tines with a transport mechanism that can carry cargo thereon;

b. a vertically-movable frame including transport means for the cargo-transfer means comprising at lease two arms extending parallel to the rows of said cargo transport means that can move vertically between the rows of said cargo-transport means said arms engaging at least two of said tines wherein said transport means for the cargo-transfer means, and said vertically movable frame is provided with a vertical displacement means for moving said transport means for the cargo-transfer means in the vertical space between said cargo-transport means.

3,904,054
TRAILERS

Cornelius van der Lely, 7, Bruschenrain, Zug, Switzerland

Continuation of Ser. No. 301,799, Oct. 30, 1972, abandoned, which is a division of Ser. No. 82,589, Oct. 21, 1970, Pat. No. 3,701,443. This application Nov. 1, 1974, Ser. No. 520,136
Claims priority, application Netherlands, Oct. 21, 1969, 6915852
Int. Cl. B60p 1/48
U.S. Cl. 214—317 13 Claims

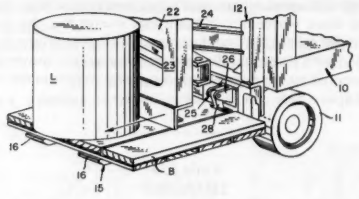


1. A trailer for transporting material in a container comprising a mobile frame, a lifting mechanism mounted on said frame, a pair of rod systems each having at least two rods, each said rod system being included in said lifting mechanism, one of each said rod systems being positioned on either side of said frame, each said rod being movable and cantable relative to said frame and comprising pivot means by which it is pivotally connected to said frame and to said container, said pivot means of each said rod system being located at the corners of a parallelogram, engagement means carried by the upper ends of each said rod system for detachably connecting said lifting mechanism to said container, rotation of said container relative to said frame during lifting of said container by said lifting means being prevented only by selectively operable portions of said engagement means, at least part of said lifting mechanism being pivotable relative to said frame about an axis of rotation transverse to the usual direction of travel of the trailer, control means for canting said container and being selectively operatively interconnected therewith, said control means being directly connected to one of said rods at a point between said pivot means of said one rod of said rod systems whereby said container may upon being lifted by said lifting mechanism be pivoted about said pivot means relative to said frame and canted relative to said frame in accordance with said control means.

3,904,055
BOARD CLAMP MECHANISM FOR LIFT TRUCK EQUIPPED WITH PUSHER

Anthony J. Allegretti, LaGrange Park, and Donald R. Duzinkas, Western Springs, both of Ill., assignors to W. F. Hall Printing Company, Chicago, Ill.

Filed June 27, 1974, Ser. No. 483,639
Int. Cl. B60p *1/02*
U.S. Cl. 214—514 **5 Claims**

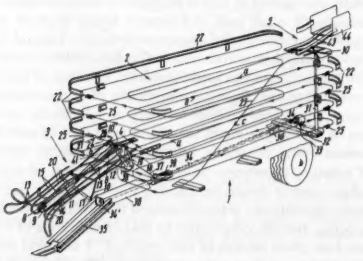


1. In combination with a lift truck including a lift frame, forwardly-extending load support means extending from the lower end of said lift frame, and a pusher mechanism carried by said lift frame and extendible above said load support means to push a load off a board carried by said load support means, the improvement comprising: a clamp assembly carried by said lift frame and including a downwardly-depending shoe member; and means for mounting said shoe member for rotation about a horizontal axis transverse of the direction of extension of said pusher means and spaced above said load support means for receiving a board when said board is pushed in a rearward direction onto said load support means, the vertical distance between the upper surface of the board received on said load support means and the axis of rotation of said shoe means being less than the distance between said axis and the location at which said shoe means engages said board, whereby when said board is urged forwardly of said load support means, the forward rotation of said shoe means causes it to move forwardly and downwardly to lockingly engage the inserted edge of said board between said shoe means and said load support means.

3,904,056
AGRICULTURAL VEHICLE

Alfred Bertling, Nordwalde, and Freidhelm Haselhoff, Reken, both of Germany, assignors to Wilhelm Kemper KG, Stadtlohn, Germany

Filed Mar. 14, 1973, Ser. No. 341,127
Claims priority, application Germany, Mar. 17, 1972, 2212914; Oct. 21, 1972, 2251801; Oct. 21, 1972, 2251802
Int. Cl. B60p *1/38*
U.S. Cl. 214—519 **29 Claims**



1. A vehicle for receiving, transporting, storing and discharging bales of hay and the like, comprising:

a frame defining a load space;

an endless conveyor operatively mounted on said frame and extending along a convoluted path through said load space, said path having a bale receiving and a bale discharging end defining a plurality of superposed horizontal planes in said load space;

bale pick-up means operatively connected to said bale receiving end of the conveyor and adapted to pick up bales directly from the ground and deliver them to said bale discharging end of said conveyor;

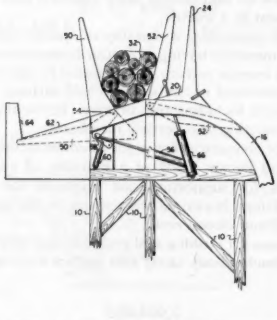
a drive mechanism operatively connected to said conveyor and adapted to move said conveyor in a stepwise manner along a distance corresponding to the length or width of a bale to thereby store the bales in said plurality of superposed horizontal planes in said load space; and

means operatively connected to said conveyor for sensing the longitudinal extent of each picked up bale along said path and adjusting the length of the steps of the stepwise movement of said conveyor in response thereto.

3,904,057
LOG BUNDLE CONVEYOR

Robert L. Smith, and Hugh Worthington, both of Seattle, Wash., assignors to Products Engineering Co., Kent, Wash.

Filed Jan. 7, 1974, Ser. No. 431,418
Int. Cl.[2] B65G *47/02*
U.S. Cl. 214—622 **3 Claims**



1. A log bundle conveyor comprising laterally spaced track means extending generally upwardly and terminating in a plane extending generally horizontally; a bundle carriage having log-engaging fork means and mounted for travel on said track means, said fork means comprising a plurality of laterally spaced tines which engage a log bundle at laterally spaced locations for moving a bundle laterally; a pivotally mounted log-engaging second fork means movable into and out of the path of travel of the log bundles on said bundle carriage as they move past said second fork means, said second fork means comprises two separate means spaced apart with one in advance and one trailing in the direction of travel of the bundle carriage and at a distance to permit a bundle to be squeezed between said spaced fork means; and means to move said bundle carriage up said track means.

3,904,058
COMBINED POCKET FLASK AND DENTURE CASE

Abraham J. Rosenstein, Clayton-Mill River Rd., New Marlborough, Mass. 01752

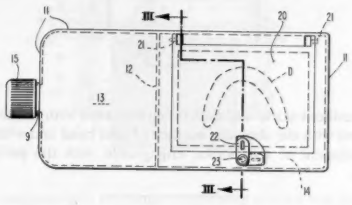
Filed Aug. 22, 1974, Ser. No. 499,571
Int. Cl.[2] A61C *19/10*; **B08B** *3/04*; **B65D** *1/04*, *81/08*
U.S. Cl. 215—6 **1 Claim**

1. A compact, portable pocket flask denture storage and cleaning apparatus comprising an elongated, flat, pocketsize flask of a size and shape for ready insertion into and removal from a standard size pocket or handbag,

said flask being sealed and water-tight and having a transverse dividing wall internally separating the space within said flask into two aligned compartments each of which is sealed and each being sealed from the other,

said flask having a neck portion connected to one of said compartments, said neck portion being provided with a water-tight cap for sealing liquid,

said flask having a hinged wall panel spaced apart from said neck portion covering an opening in a wall in the compartment remote from said neck portion, with said dividing wall located between the neck portion and opening, said opening communicating with the other of said compartments for access thereto, said other compartment being of a size and shape for storage and treatment of dentures with liquid therein, and said panel being of corresponding size and shape,



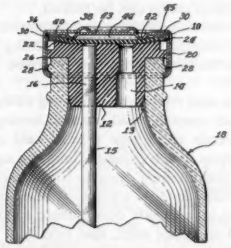
said other compartment walls and panel being lined with resilient material, and sealing material being provided around the periphery of said opening to provide a water-tight seal.

3,904,059

STERILE CLOSURE FOR SOLUTION BOTTLES

David Bellamy, Jr., Kenilworth, and James L. Gould, Springfield, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Feb. 22, 1972, Ser. No. 228,027
Int. Cl.[2] B65D *51/00*
U.S. Cl. 215—247 **7 Claims**



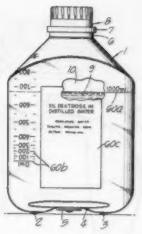
1. In a closure for a parenteral solution container having a resilient plug mounted in a container opening, and a rigid cap assembly anchored to said container and overlying said plug, and including a separate, rigid, malleable disc held in said cap assembly in a position overlying and pressing against said plug to provide a closed, sealed cap assembly, the improvement comprising a rigid annular rib defined in said rigid disc and cooperating with said plug to provide an annular, focused pressure seal whereby a space exists between the portion of said rigid disc within the annular rib and said plug for facilitating the sterilization of the underside of said rigid disc and other surfaces defining said space.

3,904,060

THREE BARRIER CLOSURE SYSTEM FOR MEDICAL LIQUID CONTAINER

Charles J. McPhee, Sylmar, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Feb. 26, 1974, Ser. No. 445,834
Int. Cl.[2] B65D *41/62, 51/18*
U.S. Cl. 215—251 **23 Claims**



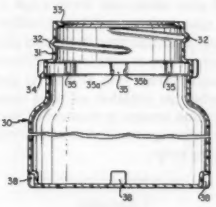
1. In a thermoplastic steam sterilizable medical liquid container, having a flange on a neck portion and an inner closure and an outer closure, the improvement of: a tube on the inner closure with a passage therethrough; a first hermetic seal closing the passage; a second hermetic seal closing the passage externally of the first hermetic seal; said outer closure encloses the first and second hermetic seals; said outer closure having an outwardly extending brim fused to said flange and includes a vent that equalizes pressure inside and outside the outer closure, so that the outer closure is relieved of differential pressure stresses.

3,904,061

TAMPER-PROOF BOTTLE CLOSURE

Frederick D. Keeler, Trumbull, Conn., assignor to The KLM Company, Stratford, Conn.

Filed May 14, 1973, Ser. No. 359,693
Int. Cl. B65d *41/34*
U.S. Cl. 215—252 **7 Claims**

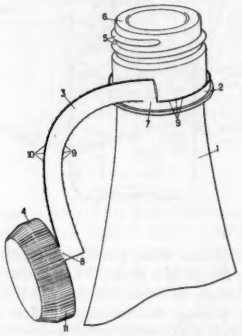


1. In combination a container having a preformed ring of plastic material projecting from and extending around a portion of the container neck with at least one notch in the ring, a closure of plastic material having a top wall, a skirt wall depending from said top wall, and a shroud ring extending from said skirt wall, said shroud ring extending over the projecting ring on the container, means for fastening said closure to said container, and at least one area of said closure shroud ring indented into a notch on said container projecting ring with a heat weld made between said closure shroud ring indented area and said container in the area of said notch, at least a portion of the welded area of the closure material remaining with the container when the closure is unfastened therefrom said closure being of substantially uniform thickness except where indented.

3,904,062
TAMPER-PROOF AND LOSS-PROOF SCREW-TYPE BOTTLE CAP

Jean Grussen, Neuilly-sur-Seine, France, assignor to Somepla S.A., Lausanne, Switzerland

Filed June 28, 1974, Ser. No. 484,112
Claims priority, application France, July 2, 1973, 73.24265
Int. Cl. B65d *49/12*
U.S. Cl. 215—252 **3 Claims**



1. Tamper-proof and loss-proof cap for a bottle having a neck provided with external threads and an external shoulder beneath said threads, said cap comprising

a continuous lower collar dimensioned to be engaged beneath said shoulder,

an upper part having internal threads mating with the external threads on said bottle, and

a connecting strip having two discrete ends and upper and lower edges, encircling said body between said upper and lower parts, so that said two ends at least nearly abut each other, said upper edge being attached to said upper part and said lower edge to said lower collar by rows of pins extending the greater part of the length of said edges, said upper edge being also attached adjacent one of said ends to said upper part by a web substantially wider and stronger than said pins while said lower edge is attached near the other of said ends to said lower collar by a web substantially wider and stronger than said pins,

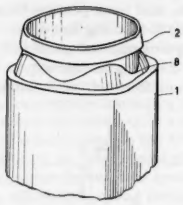
whereby rotation of upper part in one direction carries said lower part unruptured with it due to abutment of said strip ends, whereas rotation of said upper part in the opposite direction results in rupture of said pins with said upper part remaining attached to said lower collar only by said connecting strip.

3,904,063
CONTAINER AND CLOSURE

Ivo Hauser, Vevey, Switzerland, assignor to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Jan. 18, 1974, Ser. No. 434,670
Claims priority, application Switzerland, Aug. 24, 1973, 12170/73
Int. Cl.[2] B65D *41/016*
U.S. Cl. 215—318 **3 Claims**

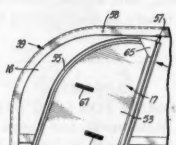
1. A container and closure combination comprising, a container, having a substantially rigid hollow neck terminating in an annular bead provided with an upper sealing surface circumscribing the bore of said neck, said bead having an annular shoulder surface arranged substantially parallel to the upper sealing surface and facing downwardly away from the latter with this shoulder surface extending laterally inward toward the neck bore, said neck being provided adjacent to said bead with peripheral bulges, said bulges being substantially crescent-shaped viewed from the end of the neck, a closure, having a substantially rigid end portion and a substantially resilient skirt, said skirt being provided with inside hooks engaged with the shoulder surface of said bead and with inner lugs adjacent to the hooks, engageable with the peripheral bulges.



3,904,064
CARGO CONTAINER WITH REMOVABLE DOORS

Robert Looker, Carpenteria, Calif., assignor to Satco, Inc., El Segundo, Calif.

Filed Nov. 23, 1973, Ser. No. 418,252
Int. Cl.[2] B65D *87/12*
U.S. Cl. 220—1.5 **16 Claims**



1. A cargo container comprising:

a floor on which cargo can be placed;

means attached to said floor and cooperating therewith to define an enclosure having an opening through which cargo can be loaded into and removed from the cargo container;

a channel on said enclosure extending along at least a portion of said opening, said channel having a side portion which extends along one side of said opening and an upper portion which extends along the upper side of said opening, said channel opening toward said opening;

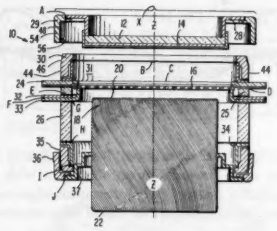
a side door sized to close a portion of said opening adjacent said one side, said side door having a side edge, a lower edge, and an upper edge, said side door being pivotable about a pivot axis between an initial position in which the door is tilted away from said one side as the door extends upwardly and an installed position in which the side edge and the upper edge of said door are received within the side portion and the upper portion, respectively, of said channel; and

interlocking means on said lower edge of said side door and said floor responsive to the pivoting of the side door from the inititial position to the installed position to interlock to retain the lower edge of the door against loads acting generally transverse to the side door, said interlocking means including an upwardly opening recess in said floor and a cooperating projection on said door adapted to be received within said recess.

3,904,065
VACUUM SEAL FOR ENVELOPE PORTIONS

Merrald Buren Shrader, Lancaster, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 8, 1973, Ser. No. 386,643
Int. Cl.[2] H01K *1/36*
U.S. Cl. 220—2.1 R 6 Claims



4. A vacuum tight envelope comprising at least two portions wherein a first portion is sealed to a second portion, said first portion having an axial extending tubulation with a cylindrical compression sealing surface thereon, said second portion including a hermetically sealed annular axial extending member attached thereto, said annular axial extending member telescoped partly within the tubulation of said first portion and including a compression sealing surface thereon, which interfaces with said cylindrical compression sealing surface on the tubulation of said first portion and which is sealed thereto by a cold compression seal, said annular axial extending member including:

a. an L-shaped annular ring attached to said second portion at a radial extending portion of said L-shaped annular ring, said L-shaped annular ring including an axial extending tubulation; and

b. an annular relieving ring of high compressive strength attached to a terminal portion of the axial extending tubulation of said L-shaped annular ring; said annular relieving ring including an annular portion in telescoping relation to said axial extending tubulation of said L-shaped annular ring; the telescoping annular portion of said annular relieving ring, and said L-shaped annular ring, each including a surface portion, which faces the surface portion of the other, and which is spaced apart from the surface portion of the other to resist and relieve compressive forces exerted in the formation of said cold compression seal between said tubulation of said first portion and said annular axial extending member, without transmitting said compressive forces to said second portion of said envelope.

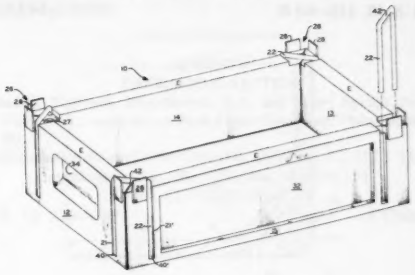
3,904,066
DOUBLE-WALL BLOW MOLDED CARTON

Newton R. Wilson, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 4, 1972, Ser. No. 294,991
Int. Cl. B65d *7/22, 11/16, 11/18*
U.S. Cl. 220—7 8 Claims

1. In a collapsible carton having a body formed from a blank of semi-rigid moldable material, said body including a bottom and at least four side sections, said sections being of double-wall construction, each of said side sections being integrally, pivotally joined with said bottom section with each of said side sections being pivotably movable to an upright position with respect to said bottom section, each of said side sections in said upright position being angularly disposed with respect to adjacent side sections with side edges of each adjacent side section abutting an adjacent side section and therewith forming a corner in the erected position, the improvement comprising:

each side section having a groove formed on the outer surface thereof adjacent each side edge, said grooves each extending substantially parallel to its respective side edge and terminating at a groove shoulder aligned with and abutting a respective protrusion extending below said side sections a sufficient distance so that when the carton is in an erected condition said protrusion will extend into

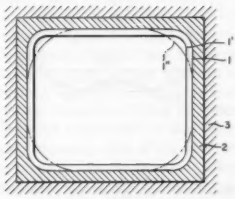


and contact a respective recess in the bottom section; and a fastener of a U configuration having a middle portion extending across the top of each respective corner, each fastener being slidably engaged and removably positioned in the associated grooves of a corner in contact with the shoulders of the grooves and being of a length sufficient for extending from the shoulder to an elevation higher than the side sections.

3,904,067
MEMBRANE TANK FOR LIQUEFIED GASES

Tsuneo Kuniyasu, Fujisawa; Daizo Goto, and Takayoshi Miyanari, both of Tokyo, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 20, 1973, Ser. No. 398,926
Claims priority, application Japan, Sept. 22, 1972, 47-95403; Jan. 30, 1973, 48-12170
Int. Cl. B65d *25/18*
U.S. Cl. 220—9 LG 3 Claims

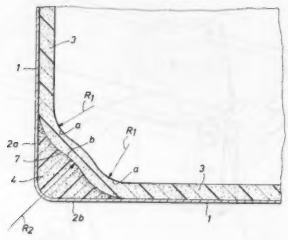


1. A storage container for liquefied gas comprising an outer shell, an inner lining of insulating material engaging the inner walls of said shell, and a flexible membrane tank within said inner lining, said tank including flat side, top and bottom portions and flat end portions, the side and top and bottom portions being connected by arcuate ridge portions each having a convex cylindrical surface, the dimensions of each flat portion of the tank being larger at room temperature than the corresponding portions of the lining, said dimensions being such that when the membrane tank is assembled within the lining, the flat portions of the tank engage the corresponding flat portions of the lining, with the arcuate ridge portions received within corners formed between adjacent side portions of the lining, said arcuate ridge portions retracting inwardly when the tank is cooled by liquefied gas placed therein.

3,904,068
TANK FOR LIQUIFIED GASES

Joseph M. E. Beaujean, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 19, 1974, Ser. No. 443,549
Claims priority, application Netherlands, Feb. 23, 1973, 7302527
Int. Cl.[2] B65D *87/34*; B63B *3/64*
U.S. Cl. 220—63 R 14 Claims

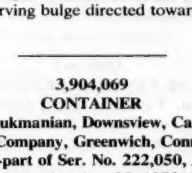


1. A tank for the storage of liquified gases, comprising a rigid outer shell internally lined with a heat-insulating foam layer, which outer shell has at least two intersecting planes, characterized in that the foam layer at the location where the two planes of the rigid outer shell intersect, forms a substantially smoothly curving bulge directed towards the interior of the tank.

3,904,069
CONTAINER

Aram Hartoun Toukmanian, Downsview, Canada, assignor to American Can Company, Greenwich, Conn.

Continuation-in-part of Ser. No. 222,050, Jan. 31, 1972, abandoned. This application Oct. 25, 1973, Ser. No. 409,734
Int. Cl. B65d *7/42*
U.S. Cl. 220—66 30 Claims

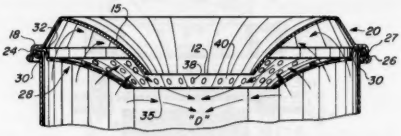


1. An eversion resistant, generally cylindrical drawn metal container having therein a product under pressure, said container including a generally cylindrical body having integral side and bottom walls, said bottom wall comprising a central inwardly domed depression surrounded by an annular panel, said depression having a marginal circular intersection with said annular panel, at least said annular panel having been outwardly distended by pressure of said product to permanently change the shape of the bottom wall such that said circular intersection becomes the outermost extent of the bottom wall, said annular panel being inclined into a generally conical shape and forming an obtuse angle with said sidewall, the percentage ratio of the area determined by the radius of said circular intersection to the area determined by the outer radius of said annular panel being in the range of from approximately 15 percent to approximately 60 percent, said circular intersection alone providing a stable base upon which the container rests in an upright position.

3,904,070
FIREPROOF WASTE CONTAINER COVER

Constantine Lisciani, Westchester, and William J. Zehr, Des Plaines, both of Ill., assignors to The Protectoseal Company, Bensenville, Ill.

Filed Sept. 10, 1973, Ser. No. 395,989
Int. Cl.[2] B65D *1/24*
U.S. Cl. 220—88 R 3 Claims

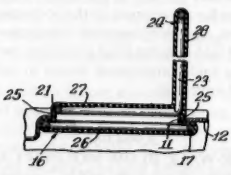


1. A fireproofed waste drum open for its full area at the top circumferential edge thereof, in combination with a removable cover installable on said circumferential edge comprising:
a. a drum having a circumferential rolled edge around its open top,
b. a cover having a flange disposed on said rolled edge, said flange having an inner rim which is connected to an annular coaxial baffle, said baffle having a downwardly concave curvature and the inner edge of said annular baffle lies in a plane substantially below the plane containing said inner rim of said flange,
c. a ring fastened to said flange, said ring sloping outwardly and downwardly over said circumferential rolled edge of said drum and terminating in a second rolled edge, said second rolled edge being disposed lower than the rolled edge of said drum to provide a snug fit therebetween,
d. said ring connected to an upwardly and inwardly sloped circumferential crown and thereafter sloped downwardly and radially concave inwardly to form a second baffle which converges with, but does not touch said first baffle, said second baffle terminating in a second opening.

3,904,071
RESEALING DEVICE FOR A CONTAINER

Richard I. Stearns, 240 Shadowwood Ln., Northfield, Ill. 60093

Filed Feb. 6, 1974, Ser. No. 440,257
Int. Cl.[2] B65D *39/00*
U.S. Cl. 220—233 3 Claims



1. A resealing device for a container having an opening therein in a wall of the container and wherein the opening has one dimension in the plane of the wall shorter than the dimension normal thereto in said plane, said device comprising a base member having a wire-like portion shaped to conform generally to the shape of the opening but having its corresponding dimensions larger than the dimensions of the opening, a cover member having a wire-like portion conforming generally to the shape of the opening but having dimensions smaller than the corresponding dimensions of the wire-like portion of the base member, a bag-like seal of fluid-impervious flexible and stretchable material containing said members, and a handle secured to said wire-like portion of the cover member whereby said device may be inserted crosswise in the direction of the longest dimension of the base member

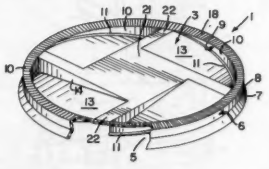
through said opening and into the interior of the container, rotated to align the base member with the opening, and then the cover member may be rocked through the opening by stretching the seal thereby to position the base and cover member respectively on the interior and exterior sides of the opening in sealing engagement with the edges thereof and with the resilience of the seal maintaining the device in such position.

3,904,072

SCREW ON LID

Robert C. Whiteside, Plainwell, Mich., assignor to Continental Can Company, Inc., New York, N.Y.

Filed Apr. 30, 1973, Ser. No. 355,831
Int. Cl.[2] B65D *43/04*
U.S. Cl. 220—288 **10 Claims**



1. A lid for threading engagement with a container having a rim forming a mouth and made of a soft cushioned material, said lid comprising:

a central section of such size as to extend substantially across the mouth of the container;

means defining a downwardly opening circumferentially extending cavity on said lid and attached to said central section and having inner and outer walls;

and

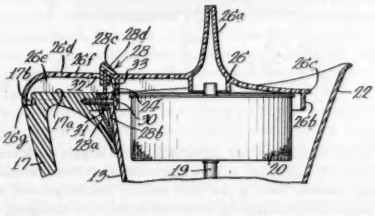
at least one thread formed on the inner wall of said cavity and inclined to the horizontal axis of the lid whereby as the lid is rotated onto the container said thread cuts into the inner side of said rim to form a detent to hold the lid onto said container.

3,904,073

COFFEE MAKER COVER RETAINING MEANS

George Henry Schaefer, Wauwatosa, and John Herbert Elger, Milwaukee, both of Wis., assignors to Oster Corporation, Milwaukee, Wis.

Filed Dec. 17, 1973, Ser. No. 425,316
Int. Cl.[2] B65D *45/00*
U.S. Cl. 220—318 **7 Claims**



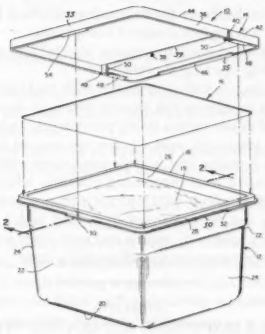
1. A coffee maker comprising a vessel having a handle disposed on one side thereof, a cover for said vessel, said vessel having sidewalls defining a generally circular mouth with a pouring spout formed in one wall thereof, a shoulder formed on said sidewalls at said mouth to support said cover, said cover having a laterally extending projection, a channel shaped groove formed in the top of said handle to receive said projection, resilient latch means mounted on vessel and biased into engagement with said cover to restrict movement of said cover out of said mouth, said laterally extending projection including means interlocking with said handle to restrict said projection against lengthwise movement in said channel shaped groove, said projection being provided with an opening through which said latch means extends, said latch means being movable out of engagement with said cover so said cover may be raised upwardly out of engagement with said vessel and handle.

3,904,074

PACKAGING SYSTEM

Louis S. Hoffman, Morristown, N.J., and Harry Spruyt, New York, N.Y., assignors to Scott Paper Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 401,235, Sept. 27, 1973. This application Aug. 28, 1974, Ser. No. 501,151
Int. Cl.[2] B65D *41/04*
U.S. Cl. 220—339 **5 Claims**



1. A packaging system comprising:

A. A container body including a bottom wall, peripheral walls extending upwardly from said bottom wall and terminating in an upper lip which defines an opening into an interior compartment of said body, peripheral downwardly facing shoulder means adjacent said lip and disposed exteriorly of said interior compartment, and transversely spaced, forwardly facing shoulders adjacent said lip and disposed exteriorly of said inner compartment intermediate opposed ends of the said body;

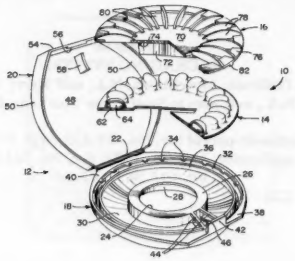
B. a unitary, snap-on closure including a top wall overlying the opening into the interior compartment of the container body, a peripheral skirt overlying outer surfaces of the peripheral walls, and an integral flexible transverse hinge intermediate front and rear ends of said closure to divide said closure into a stationary cover portion and a movable door portion;

C. said stationary cover portion including inwardly directed projection means in closely positioned underlying relationship with the downwardly facing shoulder means of said container body, and transversely spaced, rearwardly facing shoulders in closely positioned overlying relationship with the transversely spaced, forwardly facing shoulders of said container body, whereby said closure will be retained on the container body when the door portion of the closure is in either an open position permitting access to the interior compartment of the container body, or a closed position sealing the open end of said container body.

3,904,075
TABLET DISPENSER

James E. Richardson, Weston, and Stephen C. Swain, Westport, both of Conn., assignors to The Medical Dispenser Company, Atlantic Highlands, N.J.

Filed Mar. 29, 1974, Ser. No. 455,979
Int. Cl.[2] B65D *83/04*
U.S. Cl. 221—5 20 Claims



18. A tablet dispenser for dispensing tablets at least partially enclosed by a frangible material comprising

body means adapted to receive the tablets and having a dispensing opening therein; and

cover means pivotally connected with said body means and carrying an ejector tab aligned with said dispensing opening, said cover means being pivotally movable between a storage state with said ejector tab spaced from said dispensing opening and a dispensing state with said ejector tab adjacent said dispensing opening whereby a tablet disposed between said ejector tab and said dispensing opening can be dispensed from said tablet dispenser by squeezing said body means and said cover means to pivot said cover means to said dispensing state.

3,904,076
ADAPTABLE DISPENSING APPARATUS WITH UNIQUE ESCROW BAR AND ASSOCIATED LATCH MECHANISM

Harry R. Payne, Chattanooga, Tenn., assignor to Cavalier Corporation, Chattanooga, Tenn.

Filed Aug. 15, 1974, Ser. No. 497,713
Int. Cl.[2] G07F *11/08*
U.S. Cl. 221—67 14 Claims

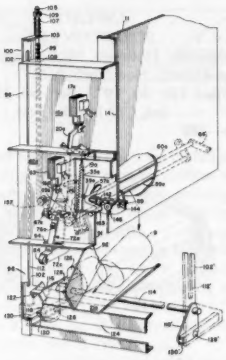
1. Apparatus for storing and successively dispensing articles from first and second staggered stacks, each stack including at least two columns of the articles with adjacent articles in the columns of a stack staggered with respect to each other and adjacent articles in the first and second staggered stacks aligned substantially axially of each other, said apparatus comprising:

a. an article support member disposed to support each of the two columns of the first and second stacks of articles, each of said article support members disposable from a first article supporting position beneath its respective column of the first and second stacks, to a second article releasing position whereby an article from one column of each of the first and second stacks is released;

b. an actuatable escrow means disposed to receive one of the two articles released by one of said first and second article support members and movable from a first article retaining position to a second article releasing position;

c. latch means pivotably mounted to be moved from a first, rest position, wherein said latch means engages and holds said first and second article support members in their first article supporting positions, to a second position wherein said latch means engages and holds said first article support member in its first article supporting position and releases said second article support member to permit it to move to its article releasing position under the weight of the articles, and to a third position wherein said latch means engages and holds said second article support member in its article supporting position and releases said first article support member to permit it to move to its second article releasing position;

d. first releasable lock means for normally retaining said pivotably mounted latch means in its first rest position;



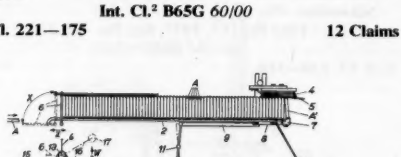
e. second releasable lock means for normally retaining said escrow means in its first article retaining position; and

f. said escrow means responsive to the release of an article by one of said first and second support members to render nonreleasable said first lock means whereby said first lock means retains said pivotably mounted latch means in its first rest position.

3,904,077
APPARATUS FOR SEPARATELY DISCHARGING ARTICLES

Pierre Luginbühl, Neuhausen am Rheinfall, Switzerland, assignor to S I G Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Oct. 2, 1974, Ser. No. 511,494
Claims priority, application Switzerland, Oct. 2, 1973, 14072/73
Int. Cl.[2] B65G *60/00*
U.S. Cl. 221—175 12 Claims



1. In an apparatus for separately discharging articles, the apparatus including an at least approximately horizontal compacting channel having an inlet end, a discharge end and a base plate constituting the channel bottom; a charging plate disposed at the inlet end of the compacting channel for sequentially introducing articles into the compacting channel; means for moving the charging plate back and forth in the longitudinal direction of the compacting channel, the improvement comprising a retaining means situated at said discharge end for engaging the foremost article of an article series intermittently advanced in said compacting channel; and means for reciprocating said retaining means parallel to

the longitudinal direction of said compacting channel in coordination with the motion of said charging plate for moving said retaining means in unison with said charging plate in the direction of article feed in said compacting channel.

3,904,078

INJECTION MOLDING MACHINE HAVING A PROGRAMMING DEVICE AND A METHOD OF OPERATING THE MACHINE

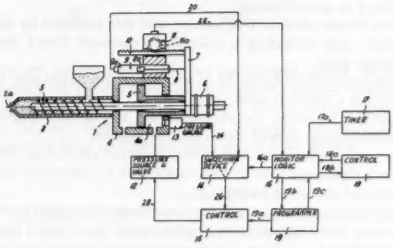
Engelbert Neff, Zollikon, and Jakob Fehr, Mollis, both of Switzerland, assignors to Maschinenfabrik u. Gusserei Netstal AG, Switzerland

Filed Jan. 18, 1974, Ser. No. 434,410

Claims priority, application Switzerland, Feb. 7, 1973, 1777/73

Int. Cl.[2] B67D *5/08*

U.S. Cl. 222—1 **10 Claims**



1. An injection molding machine, particularly for plastics, comprising an injection cylinder having an injection discharge and an inlet for material to be plasticized spaced therefrom, an injector screw rotatable in said cylinder, means to rotate said injector screw, a pressure cylinder, a piston connected to said screw and being movable in said cylinder to advance said screw, pressure means for supplying fluid pressure to said pressure cylinder to advance said piston, pressure measuring means for measuring the pressure in said cylinder to advance said piston connected to said cylinder, velocity measuring means connected to said screw for measuring the velocity of movement thereof, distance measuring means connected to said screw for measuring distance moved by said screw in operation, a control unit connected to said pressure means for controlling the fluid pressure of said pressure cylinder, and a switching device connected to said control unit to said pressure means and to said pressure measuring means and said velocity measuring means, effective during operation of said screw and upon the reaching of a predetermined pressure in said cylinder and not later than after the screw has moved in a predetermined distance to eject the plastic material, to regulate said pressure means in accordance with the covered distance and thereafter to cause said pressure means to apply an after pressure for a period of time.

7. A method of operating an injection molding machine for molding plastics which includes an injection screw rotatably and axially displaceably mounted in an injection cylinder having a discharge, means for rotating said injector screw and a pressure piston connected to the screw and being movable by hydraulic pressure to displace said screw, comprising supplying a pressure to said piston to displace said screw during the injection process and continuously measuring the pressure applied to the screw, and upon reaching a predetermined pressure by not later than after the screw has covered a predetermined distance supplying a plastic for filling a mold during a mold filling phase of operation, wherein the movement of the injector is controlled as a function of the covered distance of movement by the injector screw, and thereafter, carrying out a pressure phase in which an after pressure is applied to the injector screw on a time controlled basis in proportion to the pressure applied.

3,904,079

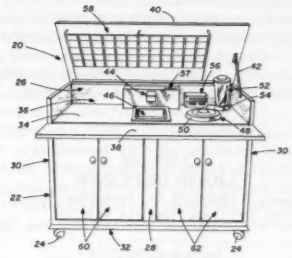
MIXED DRINK PREPARATION APPARATUS

Robert W. Kross, Dallas, Tex., assignor to George B. Neely, Dallas, Tex.

Filed Sept. 30, 1974, Ser. No. 510,656

Int. Cl. B67d *5/14*

U.S. Cl. 222—2 **12 Claims**



1. An automatic mixed drink preparation apparatus comprising:

a housing including a bottom wall, front and back walls, opposed side walls, and a top wall defining a mixed drink preparation zone;

the back wall defining at least one openable panel to provide access to substantially the entire interior of the housing;

the housing defining therein a liquor receiving zone characterized by means for receiving a plurality of quantities of different liquors each in its original container;

means within the housing for receiving a plurality of mix containers each having a quantity of mix therein;

means within the housing for receiving a water container having a quantity of water therein;

means within the housing for receiving a carbon dioxide container having a quantity of carbon dioxide therein;

a dispensing head mounted on the housing and extending into the mixed drink preparation zone at a point over the top wall of the housing;

drain container means mounted in the housing;

drain means for directing liquids from a point in the mixed drink preparation zone under the dispensing head to the drain container means;

a plurality of liquor pumps each for withdrawing liquor from one of the liquor containers in the liquor receiving zone and for discharging the liquor through the dispensing head;

valve means for controlling the flow of each liquor through the dispensing head under the action of the liquor pumps;

mix pumping means for withdrawing mixes from the mix containers and for discharging the mixes through the dispensing head;

valve means for controlling the flow of mixes through the dispensing head under the action of the mix pumping means;

mechanical refrigeration means mounted in the housing and comprising liquid chilling means;

water pumping means for withdrawing water from the water container and for directing the water through the liquid chilling means and through the dispensing head;

valve means for controlling the flow of water through the dispensing head under the action of the water pumping means;

carbonating means for receiving water from the water pumping means, for receiving carbon dioxide gas from the carbon dioxide container, and for forming carbonated water;

means for directing carbonated water from the carbonating means through the liquid chilling means and through the dispensing head;

valve means for controlling the flow of carbonated water through the dispensing head;

said liquors, mixes, water, and carbonated water comprising a plurality of liquids available for use in formulating mixed drinks;

a plurality of selectable cards each corresponding to a particular mixed drink and each bearing input means representative of the particular mixed drink; and

electronic circuitry means responsive to the input means of the cards for selectively actuating predetermined valves for predetermined periods of time and thereby effecting discharge through the dispensing head of a predetermined quantity of each liquid from the plurality thereof that is required for the selected mixed drink.

3,904,080

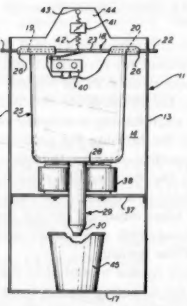
LIQUID DISPENSER

Edward Lerner, 3 Marshall St., Irvington, N.J. 07111, and

Filed Jan. 19, 1973, Ser. No. 325,202

Int. Cl. B67d *5/08*

U.S. Cl. 222—23 **5 Claims**



1. A liquid dispenser with horizontally separable, unitized liquid reservoir and valve assembly comprising,

a. a liquid reservoir,

b. a liquid discharge conduit depending from and communicating with the of the reservoir,

c. valve means in the conduit, operable in response to the imposition of a magnetic field thereupon,

d. magnetic field generating means positioned with respect to the conduit to impose a valve-operating magnetic field upon said valve means, the said magnetic field generating means being external to and detachable from said conduit and having an opening extending from the top to the bottom thereof sufficiently large to permit the passage of the conduit therethrough by movement in a horizontal plane, the said magnetic field generating means generating movement of the said valve means substantially only vertically in the said conduit,

e. the reservoir and conduit being detachable from the magnetic field generating means by movement in a horizontal plane.

3,904,081

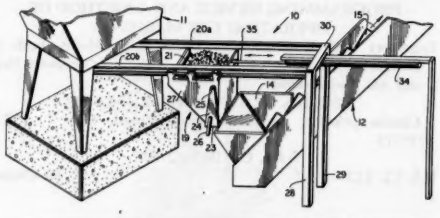
CONVEYOR APPARATUS UTILIZING SKIP BUCKET

Erbie Gail Mize, Chattanooga, Tenn., assignor to Astec Industries, Inc., Chattanooga, Tenn.

Filed May 2, 1974, Ser. No. 466,138

Int. Cl.² B67D *3/00*

U.S. Cl. 222—63 **3 Claims**



1. Apparatus for mixing and conveying batches of material, comprising in combination:

mixing means operative to receive and mix material by the batch, and including a selectively operable batch discharge gate;

means responsive to closure of said batch discharge gate to provide a signal condition;

a material receiving means positioned in laterally spaced apart relation to said batch discharge gate;

track means extending from a first location proximate said batch discharge gate to a second location proximate said material receiving means;

receptacle means mounted for movement along said track means, said receptacle means having an open upper portion which is positioned below said batch discharge gate to receive material flowing through said open batch discharge gate when said receptacle means is at said first location, and said receptacle means having a lower opening which is positioned above said material receiving means when said receptacle means is at said second location;

discharge gate actuating means selectively operative to open said batch discharge gate at a time when said receptacle means is at said first location;

gate means associated with said receptacle means and normally positioned to block said lower opening, said gate means being biassed to said normal position and being selectively displaceable therefrom in response to said receptacle means arriving at said second location;

motive means connected to said receptacle means and selectively operative to move said receptacle along said track means to either of said first and second locations; said motive means being responsive to said signal condition to move said receptacle means from said first location to said second location; and

means operative to control said motive means to return said receptacle means from said second location to said first location after discharge of material from said receptacle means.

3,904,082

WEIGHT CONTROLLED FEEDER SYSTEM

Eldon Hostetler, Middlebury, Ind., assignor to Chore-Time Equipment, Inc., Milford, Ind.

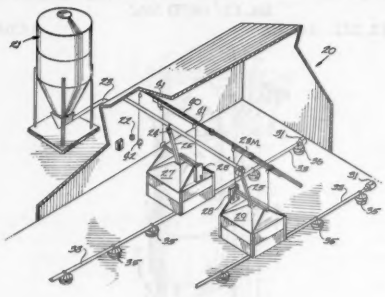
Division of Ser. No. 283,724, Aug. 25, 1972, Pat. No. 3,869,006. This application June 3, 1974, Ser. No. 476,097

Int. Cl.² B67D *5/08*

U.S. Cl. 222—70 **16 Claims**

1. Feed dispensing apparatus for delivering weighed amounts of feed to poultry and the like, the apparatus comprising time clock signal means for emitting a signal at a predetermined time and for changing the emitted signal, feedreceiving hopper means, first conveyor means for discharging feed into the hopper means in response to a change in the

time clock signal, weighing means for weighing the amount of feed discharged into the hopper, weight signal means responsive to the weighing means for changing the time clock signal when a predetermined weight of feed has been discharged into the hopper means by the first conveyor means, first feed flow



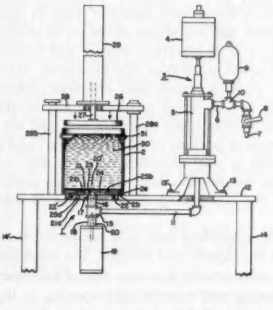
shut-off means responsive to the weight signal means for shutting off the discharge of feed into the hopper means when said predetermined weight of feed has been discharged into the hopper, and second conveyor means for receiving and removing feed discharged from the hopper means.

3,904,083

SELF-SEALING VISCOUS MATERIAL DISPENSER LOADING APPARATUS

Ward Arthur Little, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 19, 1974, Ser. No. 462,482
Int. Cl.[2] B67B *7/24*
U.S. Cl. 222—82 **13 Claims**



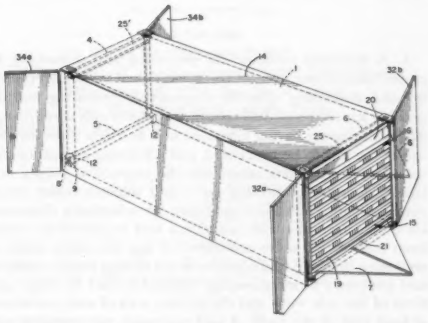
1. A self-sealing, viscous material dispenser loading apparatus adapted to receive cartridge-type receptacles, comprising a frame having a receptacle supporting surface, a cartridge-type receptacle containing viscous material, means defining a discharge passageway through said surface of the frame, a conduit connected in sealed relationship to the frame and in communication with said passageway thereby to receive viscous material discharged through the passageway, a plate member mounted on the supporting surface, means defining an aperture through a generally central portion of the plate member said aperture being positioned in communication with said passageway and being operable to receive a flow of viscous material from the receptacle, said plate member having a first surface that is substantially complementary to the receptacle-supporting surface of the frame on which it is mounted and having a second surface that is formed to coact with a surface of said receptacle removably positioned thereon to form a channel therewith, one of said coacting surfaces being provided with a plurality of spaced-apart bosses that engage the other coacting surface thereby to determine the height of said channel adjacent the bosses, said bosses being no greater than one-fourth inch in height and being effective to restrict flow of viscous material in the channel sufficiently to cause it to be cured to form a sealing gasket by exposure to air within a pre-determined portion of the area of said surface of the receptacle, said second surface of the plate member being formed of a material taken from the group consisting essentially of fluorinated polymers with at least two fluorine atoms per repeating unit of the monomer (such as tetrafluoroethylene and polytetrafluoroethylene), polyethylene, polyoxymethylene, polypropylene and non-plasticized polyvinyl chloride resins, said second surface being effective to prevent the receptacle mounted thereon from being firmly bonded to the plate member or the frame by viscous material that is discharged from the receptacle into said conduit and said channel, and means for puncturing a hole in the receptacle in communication with said discharge passageway after the receptacle is positioned with the aforesaid pre-determined portion of the surface thereof in coacting relationship with said second surface of the plate member and means for forcing the viscuous material from said receptacle into said chamber and through said aperture and passageway into said conduit.

3,904,084

PLASTIC BAG AND A PROTECTIVE CONTAINER THEREFOR AND A FIXTURE FOR SECURING THE BAG IN THE CONTAINER

Luigi Ukmar; Mario Agostini, and Gianfranco Bellandi, all of Milan, Italy, assignors to Montecatini Edison S.p.A., Milan, Italy

Filed Sept. 14, 1973, Ser. No. 397,417
Claims priority, application Italy, Sept. 20, 1972, 29432/72
Int. Cl. B65d *33/14*
U.S. Cl. 222—105 **7 Claims**



1. A large plastic bag adapted to contain granular material and disposed in a protective container having front and back doors and a floor, said bag being closed by weld lines at each end and folded to form a pair of oppositely disposed triangularly shaped integral flaps projecting outwardly from the said end; means for anchoring a first flap to the floor of the container comprising a channel member having said flap wound thereabout and means for pressing the wound flap against said channel member, means carried by said container for securing the channel member and said flap pressed thereagainst to the floor of the container; a second flap at the opposite end of the bag in the same plane as the first flap and adapted for emptying the bag; means for securing the second flap to the floor of the container adjacent to the front door of the container while the bag is being loaded and is storing bulk material, a third flap on the same end of the bag as the emptying flap, a series of elements arranged to form a vertical grating in the container immediately behind the front door and provided with a clearance through which loading and unloading flaps project, a cross-bar inserted above the grating for retaining the flap used

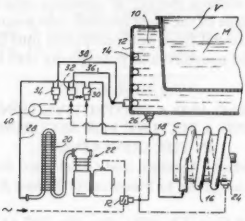
for loading the bag and means comprising a hopper secured to the unloading flap for unloading the bags contents when the door is open and the container is inclined from horizontal.

3,904,085

MACHINE FOR PREPARING AND DISPENSING ICE-CREAM WITH FLAVOR SELECTION

Ladislao Vittorio Bartyan, Viale Coni Zugna 7, Milan, Italy (20144), and Alberto Cipelletti, Via Polenghi 5, San Fiorano, Italy (20070)

Filed May 17, 1973, Ser. No. 361,323
Claims priority, application Italy, May 26, 1972, 24963/72
Int. Cl.[2] B67D 5/62
U.S. Cl. 222—131 3 Claims



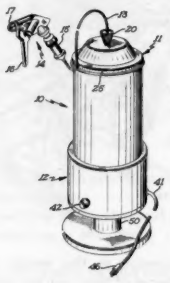
1. A multiunit machine for preparing and dispensing ice cream, comprising at least three individual ice cream preparing and dispensing units for respectively preparing and dispensing ice cream of different flavors, each unit comprising a supply container having a bottom wall and side walls for storage of the mix to be processed, and a freezing and processing cylinder in communication with the respective supply container; operator controlled valve and selector outlet means communicating with said cylinders for selectively dispensing ice cream from any one individual unit or mixed ice cream from one of said units and either of the two other units; an enclosure in which said containers are at least partly confined, said enclosure forming a space defined in part by major portions of the side walls and the bottom wall of said containers, at least part of the walls of said enclosure, not common with the walls of the containers, being made of material having a high heat conductivity; a cooled flowable medium, remaining flowable at a temperature at which the mixes are to be maintained, filling said space in contact with said major wall portion and forming a heat sink for the mixes stored in said containers; a tubular coil in contact with said part of said enclosure walls; a further tubular coil about each freezing and processing cylinder and in contact with the respective cylinder; and means for selectively circulating a cooling medium through said tubular coil of said enclosure and said further tubular coil, said means comprising a pair of sensor means for respectively sensing the temperature of the cooled medium in said space of said enclosure and the temperature of the material in said cylinders, and valve means connected to said sensor means for supplying cooling medium from said cooling medium circulating means to said coil of said enclosure only when the cooling medium supplied to the cooling coils about said cylinders has cooled the interior of said cylinders to a temperature necessary for maintaining the mix therein at a proper temperature.

3,904,086

APPARATUS FOR HEATING AND DISPENSING LIQUID SHAMPOO

Luigi Gino Losenno, 4860 W. Upland Crest, Columbia Heights, Minn. 55421

Continuation of Ser. No. 98,418, Dec. 15, 1970, abandoned.
This application Dec. 18, 1972, Ser. No. 314,495
Int. Cl.[2] B67D 5/62
U.S. Cl. 222—146 HE 3 Claims



1. Apparatus for manually dispensing liquid shampoo, comprising:

a container for liquid shampoo having a capacity many times that necessary for a single shampoo and having a relatively large main portion and terminating at its upper end in a central portion which is relatively small as compared with the minimum transverse dimension of said main portion and which has a central opening therethrough,

a base for said container comprising a base portion designed to rest upon a fixed surface, a chamber secured to said base portion substantially above the portion of said base portion designed to rest upon a fixed surface, a cylindrical hollow portion above said chamber with an upper opening of the same size and shape as the lower portion of said container to enable insertion therein and removal therefrom of the lower portion of said container, said cylindrical hollow portion above said chamber extending upwardly only a very small portion of the height of said container to facilitate the insertion into and the removal from said hollow portion of said container, and a heating unit disposed in said chamber beneath said support in heat transfer relationship with said hollow portion, and a thermostat for controlling the operation of said heating unit,

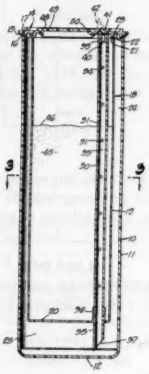
a flexible tube extending into said container through said opening in the upper end thereof, the diameter of said tube being substantially less than that of said opening, and means securing said tube in said opening in liquid-tight relationship with respect thereto including a flexible closure member through which said tube extends, said closure member having opening engaging portions of progressively increasing outside diameter proceeding from the bottom to the top so that the closure will fit containers having various size openings therein by inserting the closure and tube into the opening until the opening engaging portion adjacent the edge of the opening is of a diameter substantially conforming with the diameter of the opening,

and a nozzle and hand pump assembly secured to the outer end of said flexible tube, said hand pump being capable of readily dispensing shampoo in said container through said nozzle by reason of the decreased viscosity thereof as a result of the heating thereof, said assembly being free of fluid connections other than to said flexible tube so that said hand pump constitutes the sole means for delivering shampoo from said container through said nozzle.

3,904,087
COMPARTMENTED POWDER DISPERSING DEVICE

John W. McRoskey, 428 Homewood Rd., Los Angeles, Calif. 90049, and Delbert D. Swartz, 4808 Asteria St., Torrance, Calif. 90503

Filed Oct. 11, 1974, Ser. No. 514,122
Int. Cl. B67d 5/54
U.S. Cl. 222—193 6 Claims



1. A dispersing device of the character described, the combination including:

a. a container having a portion thereof which is deformable in part and which when squeezed will deform and decrease the volume of the interior thereof;

b. a bag in said container, said bag being of smaller size than said container so as to leave an air space in the container, the interior of said bag being at least partly filled with a material adapted to be dispersed therefrom;

c. an outlet tube having an air passage, said tube extending through said bag and having openings in the wall thereof communicating between the interior of said bag and said air passage, one end of said air passage being in communication with the air space in said container and the other end of said air passage being in communication with the exterior of the dispersing device; and

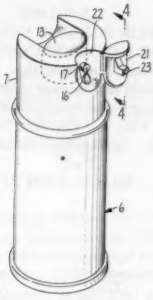
d. said parts being so formed that the squeezing of said container causes air to be forced from said container through said air passage of said tube, and said air flow through said passage causing a suction or venturi action which draws said material into said air passage and discharging it to the exterior in the form of a dispersion of material in air.

3,904,088
SAFETY CLOSURE FOR AN AEROSOL CONTAINER

Benjamin K. Milbourne, Sr., 7934 W. Third St., Los Angeles, Calif. 90048

Continuation of Ser. No. 298,564, Oct. 18, 1972, abandoned. This application Nov. 12, 1973, Ser. No. 414,652
Int. Cl.[2] B65D 83/14
U.S. Cl. 222—402.11 1 Claim

1. An aerosol dispenser, comprising a cylindrical can having opposite closed ends, one of said ends including a reduced diameter upstanding portion having an axial opening therethrough, normally closed manually operable valve means in said opening, an up-standing valve actuating rod connected with the valve means and extending axially outwardly from said one end of the can, a cylindrical cap of substantially the same diameter as the can removably frictionally secured on said one end of the can and having an axial opening therethrough and a radially extending opening through one side thereof in communication with the axial opening between the ends of the axial opening, a manually operable plunger secured on the valve actuating rod and slidably received and guided in the axial opening in the cap for engagement of the plunger externally of the cap to reciprocate the plunger and actuate the valve means when the plunger is depressed to dispense material from the can, said plunger being elongate in an axial direction and having a substantial side wall portion

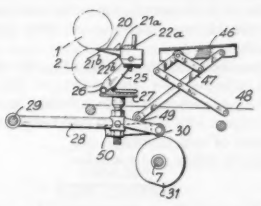


thereof engaged in the axial opening to prevent tipping of the plunger, a radially extending discharge extension on one side of the plunger and received in the radially extending opening in the cap, a hinged door carried by the cap for swinging movement about an axially extending hinge means into open and closed positions over the radial opening and discharge extension, and a projection on an inner surface of the door engagable beneath the extension to prevent operation of the plunger and valve means when the door is closed.

3,904,089
PLEATING MACHINE

Daniel Demagny, 62, rue Tiquetonne, 75002 Paris, France

Filed May 28, 1974, Ser. No. 474,068
Int. Cl.[2] A41H 43/00; D05B 35/08
U.S. Cl. 223—30 10 Claims



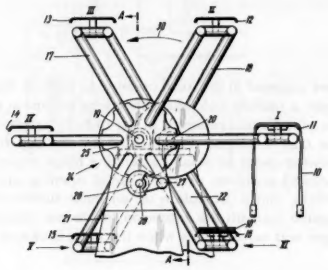
1. A pleating machine comprising a frame, two rollers arranged tangentially with respect to one another and rotated intermittently and synchronously from a continuously rotating shaft, at least one pleat-forming plate in the form of a blade fixed to said frame and directed towards the tangential line of the rollers, a comb formed by two blades, a respective crossmember connected to the ends of each of said blades, the upper blade being designed to pivot about a horizontal axis in the manner of a compass relative to said crossmembers by means of rods and eccentrics integral with a continuously rotating shaft, said comb being designed to make a pivoting movement in a plane extending through the tangential line of the rollers by virtue of the fact that it is driven at one of its ends by a control rod pivoting about a fixed point arranged between its ends, one of which is pivotally connected to said crossmember while the other is actuated by a cam keyed to a continuously rotating shaft, said comb pivoting about an axis

situated in a vertical plane extending through or near that end of the rollers opposite said rod, a table designed to receive the material to be pleated, situated in an extension of and ahead of said rollers, said table extending over a width at least equal to the sum of twice the width to be pleated and the width to be left unpleated, said table being retractable to release that part of the machine situated near the end of the lower roller on the side of the pivoting axis of the comb in said vertical plane.

3,904,090
APPARATUS FOR FOLDING SHIRTS AND SIMILAR ARTICLES OF CLOTHING

Martin Kannegiesser, Bad Salzuflen, and Heinrich Knappe, Eidinghausen, both of Germany, assignors to Firma Herbert Kannegiesser Kommanditgesellschaft, Vlotho, Germany

Filed Feb. 7, 1974, Ser. No. 440,610
Claims priority, application Germany, Feb. 12, 1973, 2306815
Int. Cl.[2] A41H *33/00*
U.S. Cl. 223—37 **6 Claims**



1. Apparatus for supporting a shirt or similar article of clothing and moving said shirt or similar article of clothing between a plurality of positions wherein said shirt or similar article of clothing is progressively folded for packaging comprising:

a. a pair of multi-armed, rotatable turnstiles, (**17,18**) each turnstile having a plurality of arms protruding radially therefrom,

b. a plurality of folding tables (**11, 12, 13, 14, 15 & 16**), each table pivotally attached to one arm of each turnstile such that each said table remains in a predetermined orientation with respect to said turnstiles throughout the rotation of said turnstiles, and

c. means to rotate said turnstiles.

3,904,091
SIDEARM HOLSTERS

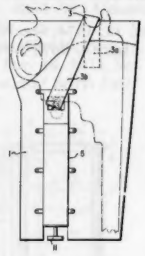
H. Jack Jones, 4520 Dalton Ave., Orlando, Fla. 32807

Filed Sept. 13, 1974, Ser. No. 505,684
Int. Cl.[2] F41C *33/02*
U.S. Cl. 224—2 B **6 Claims**

1. In a sidearm holster having a closing member disposed to extend over the top of a sidearm held in the holster and movable into a closed position for keeping the sidearm in the holster, and into an open position for permitting withdrawal of the sidearm, the improvement comprising:

latch means carried by said closing member near the end thereof, which, when said closing member is in its closed position, is adjacent the side of said holster which faces away from its wearer;

a manually operable latching mechanism mounted on said holster for holding said latch means when said closing member is in its closed position, said latching mechanism being manually movable into a position for releasing said latch means; and

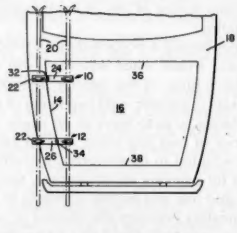


said closing member including spring means for causing said closing member to spring into its open position, and to remain therein, upon release of said latch means.

3,904,092
UNIVERSAL SKI RACK

Paul Alfred Piper, 1150 Balclutha Dr., Foster City, Calif. 94404

Filed Sept. 13, 1973, Ser. No. 396,906
Int. Cl.[2] B60R *9/12*
U.S. Cl. 224—29 R **11 Claims**

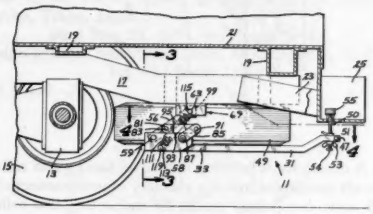


1. A ski rack adapted to attach to the edge of a trunk lid or similar planar edge portion of a vehicle having an underlying support rib proximate said edge, said rack comprising: a support member; means for attaching skis to said support member; and a clamp having one end attached to the support member and a second opposite end adapted to detachably attach to said planar edge portion of said vehicle, said second end including a first planar member adapted to abut the underside of said edge portion and having a lateral edge adapted to be maintained adjacent the support rib on the underside of said planar edge portion, a second planar member in parallel spaced opposition to the first planar member and adapted to abut the exposed upper surface of said edge portion generally opposite said first planar member, said second planar member having a portion adapted to overlie said support rib so that said clamp is at least partially supported by said rib, the portion of the second planar member adapted to overlie said support rib having a relatively wide transverse dimension to overlie a substantial portion of said support rib to provide transverse support of said clamp by said support rib, and means for urging the second planar member toward the first planar member to engage the edge portion therebetween and secure the clamp to said edge portion.

8. A ski rack system adapted to attach to the edge of a trunk lid or similar planar edge portions of a vehicle, said rack comprising a pair of discrete ski racks, each ski rack including an elongate support member, means for attaching skis to each said support member, and a pair of clamps attached to the respective support member, each said clamp having one end

selectively rotatably attached to the support member offset from the longitudinal center of said support member and a second opposite end adapted to detachably clamp to a planar edge portion of the vehicle, so that the ski racks can be attached in spaced relationship to planar edge portions of the vehicle and the support members thereof selectively rotated so that skis mounted in said ski racks are aligned with the direction of travel of the vehicle.

3,904,093
SPARE TIRE CARRIER
Harley E. Hanela, Star Rt., Virginia, Minn. 55792
Filed Sept. 11, 1972, Ser. No. 287,964
Int. Cl. B62d *43/04*
U.S. Cl. 224—42.21 **11 Claims**



1. A spare tire carrier for use on the underside of a vehicle comprising:

a. a wheel supporting brace having a forward end and a pair of sides;

b. means for releasably attaching said forward end of said brace to said underside of said vehicle;

c. linkage means;

d. means attaching a first end of said linkage means to one of said brace sides rearward of said brace forward end for rotation with respect to said brace;

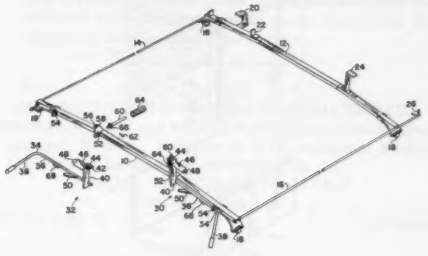
e. means rotatably attaching a second end of said linkage means to said underside of said vehicle;

f. means constraining the limits of rotation of said linkage means with respect to said underside of said vehicle between a first position of said linkage means with respect to said underside of said vehicle and a second position of said linkage means with respect to said underside of said vehicle;

g. means associated with said brace constraining the limits of rotation of said brace side with respect to said linkage means between a first relative position of said brace side and linkage means and a second relative position of said brace side and linkage means; and

h. a spring means for imparting a force, cooperatively engaged with said linkage means and attached to said brace side, such that as said brace side is rotated with respect to said linkage means between said first relative position and said second relative position there is an arc of rotation whereby the force required to rotate increases and then an immediate arc of rotation whereby said brace side rotates with respect to said linkage means by said spring force bringing said brace side and linkage means to said second relative position, and such that as said brace side is rotated with respect to said linkage means between said second relative position and said first relative position there is an arc of rotation whereby the force required to rotate increases and then an immediate arc of rotation whereby said brace side rotates with respect to said linkage means by said spring force bringing said brace side and linkage means to said first relative position.

3,904,094
LADDER RACK
Richard R. Correll, 2 Maple Ave., Atherton, Calif. 94025
Filed Sept. 6, 1973, Ser. No. 394,948
Int. Cl. B60m *9/04*
U.S. Cl. 224—42.1 F **8 Claims**



1. In a rack for carrying ladders on a vehicle, said rack having at least two cross members over which the ladders are placed to support said ladders, improved means for releasably attaching the ladders to the cross members comprising:

an arm pivotally attached at one end to one of the cross members so that said arm is pivotable between a first ladder-hold-down position and a second ladder-release position about an axis generally parallel to said cross member through a third position intermediate said first and second positions, said arm further having a generally horizontal apertured portion adjacent the other end;

a finger extending transversely from the other end of said arm to engage the rail of a ladder supported on the cross members when said arm is in said first position;

a rod pivotally attached to said cross member above the pivotal axis of the arm and extending through the apertured portion of said arm, the length of the rod between the pivotal axis of said rod and the apertured portion of said arm being at a minimum at the third position of said arm;

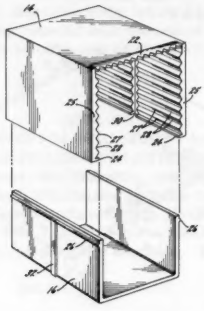
a coil spring encircling said rod and compressed against the apertured portion of said arm, said first and second arm positions characterized by lesser spring compression than said third arm position so that said spring biases said arm towards said first arm position when said arm is between said first and third arm positions, and so that said spring biases said arm toward said second arm position when said arm is between said second and third arm positions; and

lever means for pivoting said arm between said first and second positions.

3,904,095
TAPE CUTTER
Dennis D. Doyle, 1115 Hernando (A), Ft. Pierce, Fla. 33450
Filed Nov. 19, 1973, Ser. No. 416,887
Int. Cl.[2] B26F *3/02*
U.S. Cl. 225—56 **2 Claims**

1. A tape cutter adapted to be held in place about an arcuate section of an annular tape roll, comprising, in combination, a pair of interfitting U-shaped rectangular members, a cutting edge carried by the one of said members that rides on the outer peripheral surface of the tape roll, means associated with the adjoining legs of each of said members for holding the members in a plurality of relative collapsible positions with respect to one another, said relative collapsible position holding means being axially extending peaks and valleys on the legs of one of said members and axially extending beads on the legs of the other of said members, the lower ends of said member having the peaks and valleys including inwardly extending flanges that snap over the beads on said other member, and means for preventing axial movement between said

interfitting members, said axial shifting prevention means including a transverse slot on at least one of said member legs



and a transverse bead on the corresponding adjoining leg of said other member.

3,904,096

DEVICE FOR BREAKING OFF OVERFLOW SHEETS

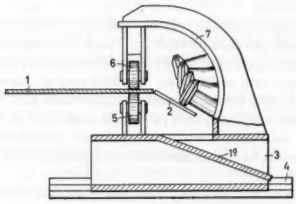
Ernst Wortmann, and Heinz Krakow, both of Hamburg, Germany, assignors to Blohm & Voss AG, Germany

Filed Apr. 8, 1974, Ser. No. 459,214

Claims priority, application Germany, Apr. 9, 1973, 2317810

Int. Cl.[2] B65H *35/10*

U.S. Cl. 225—97 **9 Claims**



1. Device for breaking off overflow sheets from the welded cross seams of plates or strips, particularly for use in a machine employed in the production of helically welded seam pipes where the plates are fed in a first direction, comprising a guideway arranged to extend in the same direction as said first direction and extending transversely to the direction of the welded cross seam between plates, means associated with said guideway for supporting the plate so that the overflow sheets extend outwardly from said supporting means on one side thereof and the rest of the plate extends outwardly from said supporting means on the other side thereof as it passes along a planar path of travel therethrough, means supported by said guideway and located adjacent to said one side of said means for contacting said overflow sheets and for bending them in a first direction and a second direction opposite to said first direction and said supporting means for the plate comprising means for contacting the plate and for preventing any bending of the plates due to the bending of the overflow sheets.

3,904,097

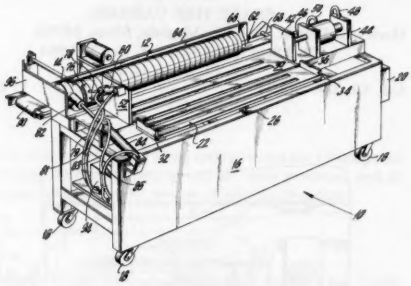
DEVICE FOR BREAKING AWAY INDIVIDUAL ROLLS FROM A ROLL OF WEB OR SHEET MATERIAL AFTER THE ROLL HAS BEEN SLIT

Lawrence C. Grambo, Jr., Westfield, and Daniel J. Coppola, Middlesex, both of N.J., assignors to General Gummed Products, Linden, N.J.

Filed Dec. 13, 1973, Ser. No. 424,615

Int. Cl.[2] B26F *3/00*

U.S. Cl. 225—103 **9 Claims**



2. A device for separating individual short width rolls from a pre-slit composite roll of a plurality of interconnected short width rolls, comprising means for supporting said rolls, first operable pressure applying means engageable with the respective ends of said roll including a movable member movable to compact said composite roll and to subsequently release it, second operable clamping means overlying said supporting means including a movable clamp plate engageable with a side of said composite roll adjacent the end thereof inwardly from the endmost short width roll to hold it against movement, and third hammer means operable exterior of said clamping means for hammering the endmost short width roll to sever it from said composite roll.

3,904,098

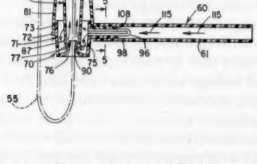
LOOP ERECTING DEVICE

Sam Kupperman, Chicago, and Dennis I. Kupperman, Glenview, both of Ill., assignors to R B Toy Development Co., Skokie, Ill.

Filed Apr. 24, 1974, Ser. No. 463,663

Int. Cl.[2] B65H *17/32*

U.S. Cl. 226—97 **12 Claims**



1. A device for erecting an elongated flexible element forming a closed loop substantially incapable of being self-supporting in static condition into a loop which is a substantially rigid structure, said device comprising means defining a chamber in which a portion of the element is disposed and constrained for movement substantially along the longitudinal axis of the portion, and a stem in communication with said chamber, said chamber comprising a first bowl having a spout forming a chamber inlet and a second bowl having a tube forming a

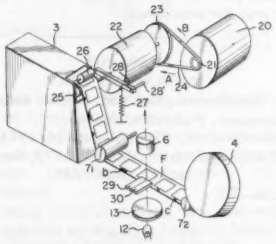
chamber outlet, said first bowl and said second bowl being interconnected by spaced apart strips constructed and arranged to fit inside of said stem, said first bowl and second bowl being constructed and arranged to be positioned in registry such that said spout extends into said tube to form an annulus of restricted area therebetween, said annulus being positioned near said chamber inlet to provide for an area of high speed fluid flow in said chamber between said spout and said chamber outlet and an area of reduced pressure outside of said chamber near said spout, injection of fluid into said stem under sufficient pressure resulting in high speed fluid flow through said annulus and said chamber in combination with an area of reduced pressure outside of said chamber near said spout to form the elongated flexible element into a loop which is a substantially rigid structure.

3,904,099

INFORMATION RETRIEVAL SYSTEM

Shunzo Inoue, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 22, 1974, Ser. No. 472,465
Claims priority, application Japan, May 28, 1973, 48-59561
Int. Cl.² B65H *23/18*
U.S. Cl. 226—33 **4 Claims**



1. An information retrieval system to selectively retrieve the desired recorded frame from a long recorded band, said system comprising;

a group-retrieval mark allocated to at least one of a series of related frame groups on the recorded band having a series of information-recorded frames;

a frame retrieval mark allocated to each frame except those to which is allocated said group retrieval mark, said group mark and frame mark being allocated to the same side on the recorded band and having different shapes;

a light-source means to irradiate each mark on the recorded band;

a pair of photoelectric conversion elements to receive optical signals from each mark when the recorded band has traveled, said pair of photoelectric conversion elements being so designed as to produce intermittently a first detection signal when a frame mark is received and produce second detection signals simultaneously when a group mark is received;

a gate means which receives individual detection signals produced by said pair of photoelectric conversion elements, in order that either one of the detection signals may be passed through selectively;

a counter means connected to said gate means, in order to count the detection signals which have passed through the gate means and to produce a control signal when the counted value has reached a predetermined value;

a control means connected to said counter means, which responsive to the counted value of the counter means controls the opening and closure of the gate means, in order to pass through particular detection signals; and

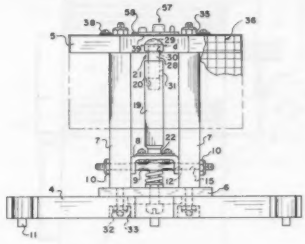
a recorded band feeding means which is connected to said counter means and receives control signals, said feeding means being so designed as to reduce the feeding speed of the recorded band and allow the recorded bandn to overrun when the counter means has counted a number of group marks equal to the number of the predetermined recorded frame, and feeds the recorded band in the reverse direction when said counter means has counted the predetermined number of frames which have overrun by way of frame marks and group marks, and then halts the recorded band when the counter means has counted the number of frames which have overrun.

3,904,100

APPARATUS FOR REPAIRING HYBRID CIRCUITS

Donald H. Daebler, and Richard P. Malmgren, both of Albuquerque, N. Mex., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 26, 1973, Ser. No. 427,617
Int. Cl.² B23K *1/00*
U.S. Cl. 228—8 **21 Claims**



1. Apparatus for operation in conjunction with a source of energy for reworking a hybrid circuit having discrete components solder mounted on one side of a substrate of the circuit, comprising

heater assembly means comprising a cap and first shank that are made of material having good thermal conductivity characteristics, said cap having a bore therein receiving one end of said first shank in a heat-transferring relationship, said cap being made of a metal that is chemically less active than the metal from which said first shank is made for maintaining a thin film of oxide on the surface of said cap;

first means for communicating said heater assembly means with the energy source for heating said cap;

second means for supporting the substrate of the hybrid circuit in a substantially horizontal position with the underside thereof facing downward adjacent said cap; and

third means for moving said cap into contact with the underside of the substrate that is supported by said second means for heating solder on the one side of the substrate through the latter.

3,904,101

METHOD OF BONDING A SHEET CLADDING TO A CONCAVE-CONVEX SUBSTRATE

Adrian M. Beltran, Ballston Lake, and Robert J. Dybas, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 10, 1974, Ser. No. 513,853
Int. Cl.² B23P *15/04*; B23K *28/02*
U.S. Cl. 228—173 **7 Claims**

1. A method of bonding a sheet cladding to a substrate, the substrate having concave and convex surfaces; the method comprising the steps of:

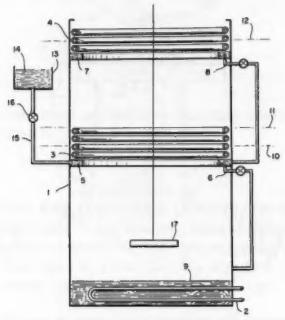
a. preforming the sheet cladding to the substrate so that the cladding closely conforms to the substrate concave and convex surfaces;

b. evacuating the space between the cladding and the substrate;
c. vacuum brazing all seams between the cladding sheet and substrate; and,
d. diffusion bonding the cladding sheet and substrate at elevated temperature and pressure in a gaseous medium.

3,904,102
APPARATUS AND METHOD FOR SOLDERING, FUSING OR BRAZING

Tze Yao Chu, Trenton; Joseph Charles Mollendorf, Skillman, both of N.J., and Robert Christian Pfahl, Jr., Glen Ellyn, Ill., assignors to Western Electric Company, Incorporated, New York, N.Y.

Filed June 5, 1974, Ser. No. 476,343
Int. Cl.[2] H05K *3/34*
U.S. Cl. 228—180 **28 Claims**



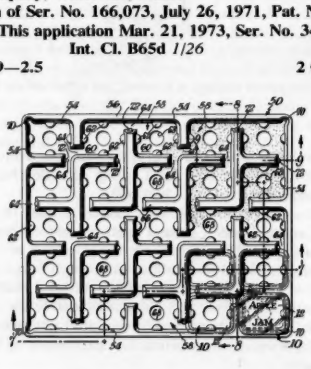
1. Method for performing on an article at elevated temperature an operation comprising the melting of material, said method comprising:
a. continuously boiling substantially at atmospheric pressure a primary liquid having a boiling point at least equal to the said elevated temperature and the melting point of said material, thereby generating a body of saturated primary vapor of said primary liquid at least at said elevated temperature, said body of saturated primary vapor overlying said primary liquid, the density of said saturated primary vapor being greater than the density of air at ambient temperature and at atmospheric pressure;
b. generating a body of secondary vapor from a secondary liquid, said secondary liquid having a lower atmospheric boiling point than said primary liquid;
c. maintaining in interposed relationship between said body of saturated primary vapor and the atmosphere said body of secondary vapor, said body of secondary vapor preventing an interface between said body of saturated primary vapor and the atmosphere, thereby substantially to prevent losses of primary vapor to the atmosphere;
d. transporting said article from the atmosphere through the body of secondary vapor into the body of saturated primary vapor;
e. condensing saturated primary vapor directly on said article thereby to heat said article at least to said elevated temperature by transfer of latent heat of vaporization of said condensed saturated primary vapor to said article;
f. performing said operation on said article;
g. thereafter, transporting said article from said body of saturated primary vapor through said body of secondary vapor into the atmosphere.

21. Method for heating an article to an elevated temperature and performing an operation on said article, said method comprising:
a. continuously boiling substantially at atmospheric pressure a primary liquid having a boiling point at least equal to the said elevated temperature thereby generating a body of saturated primary vapor of said primary liquid at least at said elevated temperature, said body of saturated primary vapor overlying said primary liquid, the density of said saturated primary vapor being greater than the density of air at ambient temperature and at atmospheric pressure;
b. generating a body of secondary vapor from a secondary liquid, said secondary liquid having a lower atmospheric boiling point than said primary liquid;
c. maintaining in interposed relationship between said body of saturated primary vapor and the atmosphere said body of secondary vapor, said body of secondary vapor preventing an interface between said body of saturated primary vapor and the atmosphere, thereby substantially to prevent losses of primary vapor to the atmosphere;
d. transporting said article from the atmosphere through the body of secondary vapor into the body of saturated primary vapor;
e. condensing saturated primary vapor directly on said article thereby to heat said article at least to said elevated temperature by transfer of latent heat of vaporization of said condensed saturated primary vapor to said article;
f. performing said operation on said article;
g. thereafter, transporting said article from said body of saturated primary vapor through said body of secondary vapor into the atmosphere.

3,904,103
PACKAGING TRAY

Gilbert R. Chadbourne, Oakland, Maine, assignor to Keyes Fibre Company, Waterville, Maine

Division of Ser. No. 166,073, July 26, 1971, Pat. No. 3,765,592. This application Mar. 21, 1973, Ser. No. 343,470
Int. Cl. B65d *1/26*
U.S. Cl. 229—2.5 **2 Claims**



1. A unitary molded packaging tray adapted to carry individual portion cups and nestable with a tray of like configuration comprising a substantially flat bottom wall with an upwardly and outwardly flaring side wall extending therefrom, a plurality of individual compartments constructed and arranged to receive portion cups, each compartment having a bottom portion with a plurality of spaced apart plateaus raised therefrom for supporting a portion cup above the bottom portion of the compartment, at least one broad flat bottom wall segment extending between each adjacent pair of compartments and disposed in the plane of the flat bottom wall of the tray whereby when trays filled with portion cups are stacked one above the other the broad flat bottom wall segments of an upper tray in the stack rest upon the outer periphery of the portion cups in the tray directly therebelow in the stack, and a plurality of elongated nonsymmetrical separated hollow rib structures extending upwardly from the substantially flat bottom wall of the tray in a nonsymmetrical pattern, the hollow rib structures together with the upwardly and outwardly flaring side wall of the tray defining the plurality of compartments, each of a majority of the hollow rib structures

defining in part at least four compartments, the plurality of plateaus associated with each compartment extending outwardly from the rib structures and the side wall of the tray into the compartments, and the plateaus associated with each rib structure being spaced apart.

3,904,104

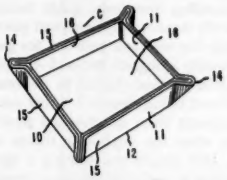
POLYETHYLENE TEREPHTHALATE/PAPERBOARD BLANK AND CONTAINER FORMED FROM SUCH BLANK

William Paul Kane, Bon Air, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 281,943, Aug. 18, 1972. This application May 9, 1974, Ser. No. 468,538

Int. Cl.[2] B65D *5/00*

U.S. Cl. 229—3.5 **2 Claims**



1. A container blank having parts including a bottom part with body parts connected thereto,

such blank being formed of a laminate including a non-browning paperboard having at least an extruded layer of substantially amorphous polyethylene terephthalate bonded thereto,

such layer being extruded onto an uncoated surface of the paperboard after such surface has been heated to a temperature of at least 285°F.,

such blank being capable of being folded to bring surface portions of such amorphous polyethylene terephthalate layer thereof into abutting contact with other surface portions of such blank and the container being formed by heat-sealing these abutting surface portions together, and such container being capable of being heated to a temperature of up to about 400°F.

3,904,105

BULK MATERIAL CONTAINER

Vernard S. Booth, Albany, Ga., assignor to Olinkraft, Inc., West Monroe, La.

Filed Oct. 18, 1973, Ser. No. 407,559

Int. Cl.[2] B65D *1/36, 3/24, 5/48, 81/00*

U.S. Cl. 229—15 **15 Claims**

1. A bulk material container comprising

a body including a pair of cells having open bottom portions;

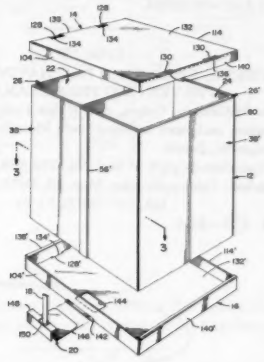
a bottom cap receiving said body and having a wall closing said open bottom portions of said cells and aperture means in said wall providing communication with said cells;

pull-plate means slidably mounted in said bottom cap to be movable between a closed position covering said aperture means and an open position at least partially opening said aperture means to permit controlled dispensing of bulk material simultaneously from said cell;

wherein each of said pair of cells is formed of a folded paperboard sleeve having an inner side panel, said inner side panels of said sleeves being laminated together to form a central partition in said body separating said pair of cells;

wherein a paperboard liner is bonded to each of said sleeves;

wherein each of said sleeves has an end panel disposed transverse to said inner side panel to define a front central corner for each of said cells, said inner side panels and said end panels each having a bottom edge with a flange extending therefrom, said flanges having side edges spaced from said front central corners to define adjacent openings on opposite sides of said central partition, and said aperture means includes an aperture spanning said adjacent openings; and



wherein said pair of cells of said body have open top portions and said pull-plate means has a slot formed therein, and further comprising a top cap closing said open top portions of said cells, and a banding strap extending around said body and said top and bottom caps and passing through said slot in said pull-plate means to hold said pull-plate means in said closed position.

3,904,106

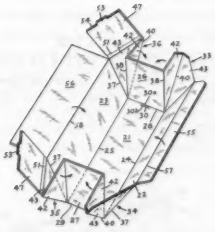
CARTON

Jerome Earl Elder, Minneapolis, Minn., assignor to International Paper Company, New York, N.Y.

Filed July 13, 1973, Ser. No. 379,180

Int. Cl.[2] B65D *5/24*

U.S. Cl. 229—31 R **21 Claims**



1. A single piece carton comprising:

a bottom panel with foldably attached side and end wall panels;

corner connector panels, intersecting edges of which are foldably attached, respectively, to an end and side wall panel, the connnector panel having a diagonal fold line passing through the intersection of the edges to divide the panel into a first triangular section foldably attached to an end wall panel along one of the intersecting edges and a

second triangular section foldably attached to a side wall panel along its other intersecting edge;

the triangular sections being folded along the diagonal fold line into face contact and disposed externally of the end wall panel with the first triangular section between the end wall panel and the second triangular section;

a locking panel joined to the second triangular section of at least one of the corner connector panels at each end of the carton and extending over the upper edge of the end wall panel into the carton interior; and

means maintaining the locking panel in face contact with the end wall panel.

3,904,107

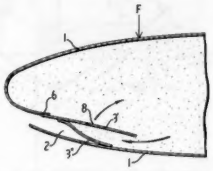
SYNTHETIC RESIN FILM BAG HAVING VALVE FOR PREVENTING FREE LEAKAGE

Makoto Nishimura, Tokyo, and Hideo Fujii, Yokohama, both of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Yamaguchi, Japan

Continuation-in-part of Ser. No. 276,558, July 31, 1972, abandoned. This application Mar. 20, 1974, Ser. No. 453,054

Int. Cl.[2] B65D *31/14*

U.S. Cl. 229—62.5 **8 Claims**



1. A bag made of a flexible base film or sheet comprising: a valved opening having an entrance port defined by said base film or sheet and a set of plied films consisting of a long leg and a short leg;

wherein one end of said short leg is sealed upon said long leg within said valved opening, one end of said long leg is sealed to said base film at said entrance port, and the longitudinal side edges of said set of plied films are heat sealed to said base film, thereby preventing any contents of said bag from easily escaping; and

wherein further at least one slit means is provided within said long leg at a region which is not heat sealed with respect to said short leg for facilitating opening of said valve and removal of the contents from said bag, and for relieving excess pressures within said bag.

3,904,108

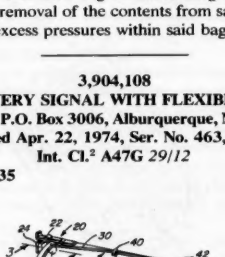
MAIL DELIVERY SIGNAL WITH FLEXIBLE ADAPTER

Robert H. File, P.O. Box 3006, Alburquerque, N. Mex. 87110

Filed Apr. 22, 1974, Ser. No. 463,157

Int. Cl.[2] A47G *29/12*

U.S. Cl. 232—35 **1 Claim**



1. In combination, a conventional-type rural mailbox embodying a horizontal bottom wall, vertical side walls, a horizontal top wall, a vertical end wall closing one end, open at its opposite mail inserting and removing end, a marginally flanged closing door for said open end, said door being pivotally mounted on a coordinating end of said bottom wall and adapted to swing outwardly and downwardly in a manner, as usual, to uncover said open end, latching and retaining means on said door and mailbox, respectively, normally securing said door in a closed position, an elongated flexible cord, means slidingly and operatively mounting said cord on said mailbox, said flexible cord embodying a forward end, a rearward end and an intervening median portion, a closed-door positioning and anchoring means attached to and cooperatively carried by said forward end and adapted to be retentively but releasably held, when said door is closed, in a set but ready-to-function position, said mounting means including a guide eye mounted on said top wall of the mailbox adjacent its longitudinal center and a guide eye mounted adjacent the juncture between the top wall and end wall of the mailbox for retaining a major portion of the cord adjacent the top wall and the remainder of the cord depending therefrom, guide means on the mailbox spaced vertically downwardly from said guide eye adjacent the juncture of the top wall and end wall for guiding a portion of the cord vertically alongside the end wall of the mailbox, and a weight attached to and carried by the rearward end of said flexible cord and being disposed below said guide means for vertical movement from an elevated position adjacent said guide means when the anchoring means is secured by the closed door, said weight constituting a signal and automatically descending to and maintaining a signalling position substantially below the bottom wall of the mailbox when the door of said mailbox is opened by the carrier to pick up outgoing mail or to deliver incoming mail, said weight providing an easy-to-see signal suspended by the cord in a pendulum-like manner for highly reliable attention-attracting purposes, wherein said guide eye on the top wall of the mailbox is mounted exteriorly thereof, said guide eye at the junction between the top wall and end wall being mounted on the exterior thereof, said guide means disposed below the guide eye adjacent the juncture between the top and rear wall including a guide eye mounted substantially centrally of the end wall on the exterior surface thereof with the weight being concealed behind the mailbox and alongside of the end wall adjacent the guide eye thereon when in elevated position and being of sufficienct weight to pull the cord longitudinally when the anchoring means is released by opening the door so that the weight will depend substantially below the bottom wall of the mailbox, said guide eye on the center of the top wall of the mailbox serving as a limit means for engagement by said anchor means when the weight pulls the cord longitudinally when the door is opened thereby limiting the downward movement of the weight, said anchoring means on the forward end portion of the cord including an enlargement disposed interiorly of the upper edge of the top wall of the mailbox with the adjacent portion of the flexible cord being received between the edge of the top wall of the mailbox and the door when the door is in closed position thus retaining the weight in elevated, substantially concealed and non-signally position alongside of the end wall of the mailbox and immediately adjacent the guide eye on the end wall of the mailbox.

3,904,109

MULTIPLE DENSITY SEPARATOR

Gene E. Underwood, P.O. Box 1759, Casper, Wyo. 82601

Filed Dec. 14, 1973, Ser. No. 424,773

Int. Cl.[2] B04B *5/06, 7/18, 11/06*

U.S. Cl. 233—2 **16 Claims**

1. A multiple density separator comprising:

wall structure forming an outer chamber,

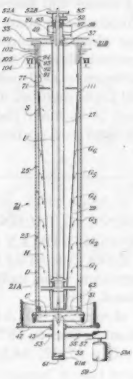
wall structure forming an inner chamber located within said outer chamber,

said inner and outer chambers being fixedly connected together,

means for rotating said chambers,

said inner chamber having outside wall surface spaced from inside wall surface of said outer chamber forming a material separating chamber therebetween,

an inlet formed through said wall structure of said outer chamber at one end of said separating chamber for allowing the flow of material from said inlet toward the other end of said separating chamber while said chambers are rotating,



inward flow means formed through said wall structure of said inner chamber for flowing material next to the outside wall of said inner chamber inward into said inner chamber,

discharge means for discharging out of said separator, the materials flowing inward into said inner chamber, and

separate flow means including flow conduit means formed through said wall structure of said outer chamber downstream of said inward flow means for flowing material downstream of said inward flow means out of said separating chamber.

3,904,110

LARGE MARK TOLERANCE CARD READER

David M. Bottles, Long Beach, Calif., assignor to Compucorp, Los Angeles, Calif.

Filed July 27, 1973, Ser. No. 383,170

Int. Cl. G06k *7/10;* **G08c** *9/06*

U.S. Cl. 235—61.11 E **8 Claims**

1. A card reading system comprising:

a card printed with boundary indications that define markable areas arranged in spaced columns and rows, each markable area having a predetermined maximum thickness along the card path;

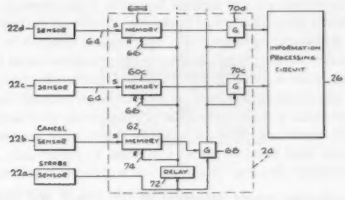
means for moving said card along a predetermined card path;

a plurality of spaced information sensors disposed along said card path, each sensor responsive to light substantially only within a viewed region of the card path which has a thickness along the length of the card path of less than one-half the thickness of each of said markable areas;

a plurality of memories, each changeable from a first state to a second state in response to a corresponding sensor sensing a mark;

means for reading out said memories at times when the card is positioned so that the regions viewed by the sensors are between columns of markable card areas; and

resetting means for placing said memories in said first state



after they are read out and before the next column of markable areas reaches the regions viewed by the sensors.

3,904,111

TEMPERATURE RESPONSIVE FLOW REGULATING LAMINATED CONDUIT

Lars Henry Petersson, Torslanda, Sweden, assignor to AB Volvo Penta, Goteborg, Sweden

Filed May 15, 1973, Ser. No. 360,567

Claims priority, application Sweden, May 23, 1972, 6693/72

Int. Cl. G05d *23/12;* **F16l** *11/12*

U.S. Cl. 236—93 **2 Claims**

1. A conduit for the transport of combustible material, comprising inner and outer layers, said inner layer comprising a temperature-responsive expansible polymeric material containing a blowing agent causing expansion upon heating to a predetermined temperature thereby to block the flow channel of the conduit, said outer layer comprising pressure and temperature-resistant material and surrounding said inner layer to direct the expansion of said inner layer radially inwardly.

3,904,112

RAILBED

Stig Helge Gunnar Thim, Helgevarma, and Lennart A. Borup, Bromma, both of Sweden, assignors to A-Betong AB, Vaxjo, Sweden

Filed May 8, 1974, Ser. No. 468,103

Claims priority, application Sweden, May 11, 1973, 7306727

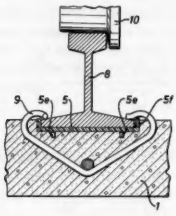
Int. Cl.[2] **E01B** *3/00*

U.S. Cl. 238—84 **8 Claims**

1. A railbed, comprising:

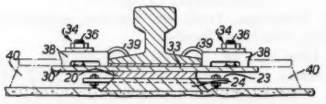
a. an elongated sleeper member formed of hardened cast concrete and adapted to serve as a rail supporting element,

b. an insert of elastic material integral with the sleeper member and imbedded therein during the casting thereof, said insert being adapted to serve as a cushioning mounting pad for a rail secured to the sleeper member, and



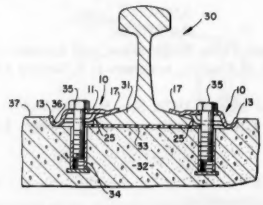
c. anchoring means attached to the insert and extending into the sleeper member for securely fastening the insert thereto in a predetermined position.

3,904,113
RAIL TRACK ASSEMBLIES
George Molyneux, Eastbrook Rd., Gloucester, England
Filed Sept. 13, 1973, Ser. No. 396,781
Claims priority, application United Kingdom, Oct. 5, 1972, 45877/72
Int. Cl.[2] E01B *9/38*
U.S. Cl. 238—264 **15 Claims**



1. A heavy duty rail track assembly comprising a rigid concrete base, a metal sole plate mounted above said base, a track rail located on said sole plate, locators connecting said track rail to said sole plate, anchorages connecting the sole plate to said base, a layer or a rigid filling composition containing a hard setting synthetic plastics material between said sole plate and said base, the width of said filling composition being limited to less than the lateral width of the sole plate, and means confining the said filling composition to said limiting width.

3,904,114
RAIL CLIP
John A. Kasuba, Painesville, Ohio, assignor to True Temper Corporation, Cleveland, Ohio
Filed Apr. 1, 1974, Ser. No. 457,067
Int. Cl.[2] E01B *9/30, 9/34*
U.S. Cl. 238—349 **20 Claims**



1. A rail fastener for securing the flange of a rail to a supporting cross member comprising in combination:

a rail clip having
an outer end portion seated upon said cross member,
an inner end portion provided with a top bearing means overlying said rail flange,
a central plate connecting said end portions and having a passageway extending therethrough,
leg means depending from said central plate and spaced inwardly of said passageway, said leg means provided with a side bearing means engaging an edge of said rail flange, and
arm means offset downwardly with respect to said plate and rigidly connecting said bearing means of the leg means and said outer end portion of the clip to hold said side bearing means and said outer end portions in a substantially fixed spaced apart relationship; and
a fastening member which is secured to said cross member and which extends through said passageway in said central plate and bears on said central plate to press the same toward said cross member and hold said rail clip firmly compressed at its inner end portion to said rail flange and at its outer end portion to said cross member.

3,904,115
AUTOMOBILE RINSING TECHNIQUE WHICH ELIMINATES ENVIRONMENTALLY OBJECTIONABLE WASTE WATER STREAMS
Robert J. Adams, Youngstown, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio
Continuation-in-part of Ser. No. 401,147, Sept. 27, 1973, abandoned. This application Dec. 6, 1973, Ser. No. 422,276
Int. Cl. A01n *17/02;* **A62c** *1/12*
U.S. Cl. 239—8 **5 Claims**

1. In the process for washing an automobile surface consisting of at least the sides and top of the car comprising the steps of (*a*) applying water containing one or more surface active agents to the automobile surface to remove the dirt, grease and other foreign matter from the surface of the automobile and (*b*) rinsing the surface active agents from the automobile surface by spraying a substantially pure aqueous stream onto the automobile surface from a plurality of spray nozzles adjacent to the automobile surface,

the improvement to the rinsing step comprising spraying the substantially pure aqueous stream onto the automobile surface from the spray nozzles at an outlet pressure of at least 120 pounds per square inch using less than about 20 gallons of water per automobile.

3,904,116
PORTABLE CORDLESS SPRAYER
John E. Jones; Lynn D. Lineback, and Charles F. Sherrill, all of Danville, Va., assignors to Disston, Inc., Danville, Va.
Filed Jan. 9, 1975, Ser. No. 539,867
Int. Cl.[2] B05B *9/04*
U.S. Cl. 239—127 **6 Claims**

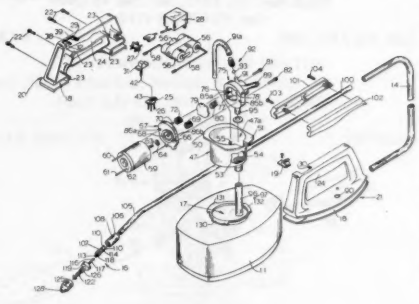
1. A portable cordless apparatus for disbursing a liquid under pressure for spraying, and the like, comprising:

a. an integral molded housing having an upper horizontal handle-shaped compartment, a base portion with an open bottom appended below said handle compartment, and a lower cup-shaped compartment having an open top end secured to and centrally of said base portion;
b. a liquid container formed by side, bottom and top walls, said top wall being formed to centrally mount said base portion and having a central opening to receive said cup compartment for suspension within said container during normal operation;
c. locking means for releasably locking said liquid container to said base portion with said cup compartment so suspended;
d. a pump having a battery powered motor and mounted within said cup compartment, said pump having an inlet pipe extending through the wall of said cup compartment

and terminating within said container proximate said container bottom wall, having an outlet pipe terminating externally of said housing, said pump further having bypass piping connected to bypass fluid from the outlet side of said pump to said container and including a check valve with a ball free to move between open and close positions dependent on the pressure developed at said pump outlet side;

e. battery means mounted in said cup compartment;

f. a manual control switch mounted in said handle compartment and having connected wiring extending through said handle compartment and base portion to said cup compartment enabling said switch to connect said battery means to said pump motor and thereby operate said pump;



g. circuit means mounted in said housing and adapting said battery means to be connected to external charging means; and

h. conduit means connected to said outlet pipe and adapted to disburse said liquid through a nozzle in some predetermined pattern, said nozzle including a spring loaded ball check valve therein, said bypass piping check valve and nozzle check valve being designed with operating pressures such that said pump operates through said piping and bypass valve until fully primed and after priming develops sufficient pressure to open said nozzle check valve and maintain said nozzle check valve open so long as but only so long as said pump operates.

3,904,117

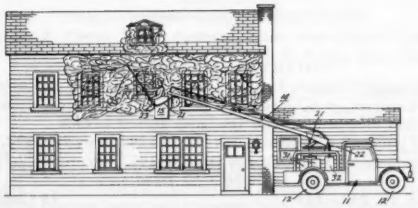
HOUSE PAINTING

Paul R. Adams, Jr., 402 Washington Ln, Fort Washington, Pa. 19034

Division of Ser. No. 140,044, May 4, 1971, abandoned. This application Dec. 7, 1973, Ser. No. 422,978

Int. Cl. B05b *9/02*

U.S. Cl. 239—146 **5 Claims**



1. House painting apparatus comprising a self-propelled motor vehicle having an extensible boom, a carrier mounted at one end of said boom, means mounting the other end of said boom on said vehicle for displacement of said one end horizontally and vertically, said boom being extensible by controls mounted on said one end of said boom, at least one reservoir mounted on said vehicle, pump means associated with said reservoir, said vehicle having a power means connected to said pump means for driving the same, and pressure-line means extending from said reservoir to said carrier along the length of said boom and terminating in a terminal fitting operable to be connected to spray means selected from the group including a nozzle, a spray wand and a spray gun, said motor vehicle comprising a wheeled vehicle having oversized pneumatic tires on its wheels, said tires being relatively smooth and devoid of cleated treads, and when inflated providing a wide contact area between said tires and the terrain on which they rest so as to distribute the load of said vehicle over said wide area and thereby minimize the pressure in pounds per square inch applied to the terrain by said vehicle to a value less than that exerted by a man walking in ordinary shoes over the terrain, the width of each tire being at least half its outside diameter, and having a substantially smooth uninterrupted surface across its entire width.

3,904,118

AGRICULTURE SPRAY BOOMS

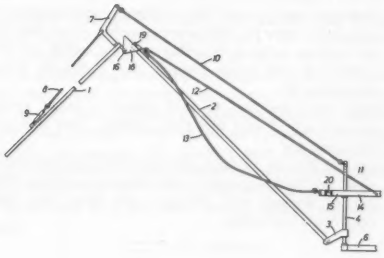
Horstine Farmery, North Newbald, York, England

Filed Sept. 30, 1974, Ser. No. 510,668

Claims priority, application United Kingdom, Sept. 28, 1973, 45465/73

Int. Cl. B05b *1/20*

U.S. Cl. 239—165 **4 Claims**



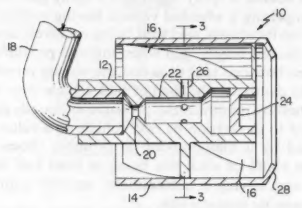
1. An agricultural spray boom for mounting on fixed structure carried by a vehicle, including an outboard boom section having first and second ends, an inboard boom section having first and second ends, pivot means connecting said second end of said outboard section to said first end of said inboard section, a rockable mounting rockable about a vertical axis relative to said fixed structure, pivot means connecting said second end of said inboard section to said rockable mounting, an L-shape member with a free end carried by said outboard section adjacent said second end thereof, a rigid member connecting said L-shape member and a point adjacent said first end of said outboard section, a first cable connecting said free end of said L-shape member to said fixed structure at a point above said rockable mounting, two oppositely extending members of different length each with a free end and carried by said fixed structure at a point between the attachment of said first cable and said rockable structure, and second and third cables of substantially equal length and connected to near said first end of said inboard section and to said free ends of said oppositely extending members respectively.

3,904,119

AIR-FUEL SPRAY NOZZLE

Sidney C. Watkins, Bridgeport, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Dec. 5, 1973, Ser. No. 422,094
Int. Cl.[2] B05B 7/10, 7/06
U.S. Cl. 239—405 2 Claims



1. A spray nozzle for mixing fuel and air therein, said nozzle comprising:

a cylindrical housing having an inner chamber on the axis thereof, a plurality of circumferentially spaced helical vanes radially extending outwardly from said housing, said vanes extending over essentially the entire length of said housing, said chamber having a fuel inlet and a plurality of fuel outlets, each of said fuel outlets extending radially through said housing into the spaces between said vanes;

a cylindrical wall mounted coaxially with said cylindrical housing, said wall being spaced from said housing by said vanes, said vanes contacting said housing throughout the entire length of said vanes to provide a plurality of helical passages, each of said fuel outlets communicating with a respective passage, said housing having an air inlet at one end and an outlet at the other end, the outlet end of said cylindrical wall being formed with a radially inwardly projecting lip;

means supplying fuel to said chamber under pressure, whereby all of said fuel flows radially into said helical passages; and

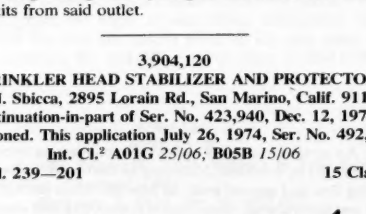
means for flowing air through said helical passages whereby all of said fuel supplied to said chamber is mixed with air moving through said passages, and mixed fuel and air exits from said outlet.

3,904,120

SPRINKLER HEAD STABILIZER AND PROTECTOR

Peter J. Sbicca, 2895 Lorain Rd., San Marino, Calif. 91108

Continuation-in-part of Ser. No. 423,940, Dec. 12, 1973, abandoned. This application July 26, 1974, Ser. No. 492,040
Int. Cl.[2] A01G 25/06; B05B 15/06
U.S. Cl. 239—201 15 Claims



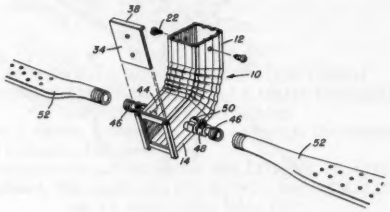
1. A sprinkler head stabilizer and grass guard comprising: a thick disc of molded non-rigid pliant plastic material having a diameter of the order of double that of a lawn sprinkler head and adapted to be mounted in a countersink in the lawn not deeper than the sprinkler head, said disc having a central opening therethrough radially recessed at its upper end, said opening being sized to seat a radially flanged sprinkler head, the upper surface of said disc having a multiplicity of long thin flexible protrusions integral with and projecting upwardly therefrom simulating blades of grass, a thick wide guard ring means encircling the upper end of said central opening with its upper end lying in a plane spaced substantially above the upper end of a sprinkler head when seated in said central opening and serving to prevent the blades of a lawn mower from contacting the sprinkler head while passing thereover, and said disc being adapted to be recessed into the lawn with the lower ends of said simulated grass blades generally flush with the ground.

3,904,121

WATER DISTRIBUTOR FOR DOWNSPOUTS

Edward R. Geagan, 895 Barton Ave., Rockledge, Fla. 32955

Filed Nov. 20, 1973, Ser. No. 417,609
Int. Cl.[2] B05B 1/14
U.S. Cl. 239—208 8 Claims



1. A water distributor comprising a rigid hollow elbow shaped extension selectively mountable on the lower end of a downspout in water receiving communication therewith, said extension including opposed generally equal length linear end sections comprising a first downspout engaging mounting end section inward of a first end of the extension and a second water discharging end section inward of the second end of the extension and angularly related to the mounting section, means for restricting the axial discharge of water from the discharge end section through the second end of the extension comprising a panel closing the second end of the extension, said panel having a small number of water passing openings therein forming a combined flow path of substantially less area than the area of the second end, and means encouraging lateral discharge of water from the discharge end section inward of the second end, the means encouraging lateral discharge of water from the discharge end section comprising at least one lateral opening through said discharge end section and a hose coupling mounted on the extension in alignment with the opening, said hose coupling being adapted to selectively mount an elongated water distributing hose.

3,904,122

ROTARY DESALTING DEVICE

Emanuel Schnitzer, Houston, Tex., assignor to H. B. Zachry Company, San Antonio and Frontier Engineering Corporation, Houston, both of, Tex., part interest to each

Continuation-in-part of Ser. No. 252,202, May 11, 1972, abandoned. This application Dec. 26, 1973, Ser. No. 427,793
Int. Cl. B05b 3/10; B44d 5/10
U.S. Cl. 239—223 15 Claims

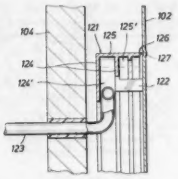
1. A liquid distributor which comprises:

a U-shaped means forming an outer ring;

a plurality of post means for attaching said U-shaped means to a disc which are attached to the top of the U of said U-shaped means;

skirt means extending from the bottom of the U of said

U-shaped means on the same side as said post means which forms a second ring; and



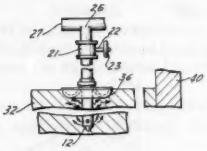
extending lip means extending from said skirt means as a tapered knife edge.

3,904,123

WATERPROOFING APPARATUS

Sidney Fils, 6 Flint Ln., Jericho, N.Y. 11753

Filed July 18, 1973, Ser. No. 380,495
Int. Cl.[2] B05B *1/28*
U.S. Cl. 239—271 **10 Claims**



1. Apparatus for injecting a fluid provided by a pump into the ground, comprising:

a. an elongated pipe having an open end, a closed end, and a plurality of spaced holes adjacent the closed end;

b. means for coupling the open end of the pipe to the pump;

c. a flexible member having a tubular section which flares out into a cup-shaped section, said tubular section being slidably coupled to the outside of the pipe with the cup-shaped section extending from the tubular section towards the closed end of the pipe; and

d. means for selectively clamping the tubular section to a part of the pipe such that the flexible member is located between the open end and the spaced holes, the clamping means providing a fluid tight seal between the pipe and the tubular section, and such that when the closed end of the pipe is inserted into the ground and the cup-shaped section is biased against the ground, the section flexes and an annular inner surface of the section presses against the ground surface around the pipe.

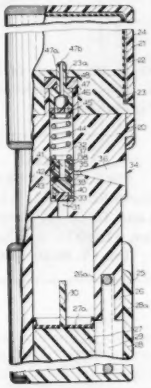
3,904,124

PRESSURIZED PRODUCT DISPENSER

Roger P. Caron, North Andover, Mass., and Chester Luke, Bolton, Conn., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Continuation of Ser. No. 411,267, Oct. 31, 1973, abandoned. This application Aug. 8, 1974, Ser. No. 496,282
Int. Cl. B05b *7/30*
U.S. Cl. 239—350 **18 Claims**

18. A dispenser for dispensing liquid product in fine droplet form in compressed air, comprising a dispenser body, nozzle means opening out of said dispenser body, an air compressing piston cylinder means mounted on said body and having a fixed member and a movable member movable relative to the fixed member through a compression stroke to compress the air, said body having a compressed air flow path therethrough from said compressing piston cylinder means to said nozzle means for conducting compressed air from said air compressing piston cylinder means to said nozzle means, a valve member in said body and normally obturating said compressed air flow path, actuating pin means operatively associated with the movable member of said air compressing piston cylinder means and said valve member for positively actuating said valve member to open said compressed air flow path near the end of said compressing stroke only when said air compressing piston cylinder means has compressed air to a predetermined pressure, a product container means for a liquid product forming part of said dispenser and having a product flow path therefrom to said nozzle means, a product pressuring means



in said flow path for pressuring the product and having a movable member movable relative to to the dispenser body for pressurizing the product, the movable member of said product pressurizing means being coupled to said valve member for movement substantially simultaneously with the movement of said valve member by said actuating pin means for moving said movable member of said product pressurizing means for pressurizing the product, and return bias means engaged with said movable member of said product pressurizing means and said valve member for holding said valve member closed until it is positively opened by said actuating pin means.

3,904,125

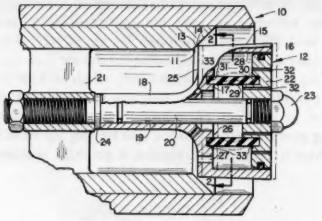
CONSTANT PRESSURE NOZZLE DISCHARGE MECHANISM

George G. Allenbaugh, Wadsworth, Ohio, assignor to Premier Industrial Corporation, Cleveland, Ohio

Filed Mar. 14, 1974, Ser. No. 451,017
Int. Cl.[2] B05B *1/32*
U.S. Cl. 239—452 **10 Claims**

1. In a pressure-control baffle for a liquid discharge nozzle, the combination of a hollow baffle cylinder disposed in the path of pressurized liquid flow and defining an adjustable discharge orifice, a piston assembly operatively mounted in said cylinder and secured to the nozzle to support said cylinder for discharge-control movement relatively thereto, said piston assembly sealing said cylinder against discharge of fluid therethrough, an effective pressure-responsive area defined by the diametrical surface of the wall of said cylinder and exerting a variable pressure-induced force thereon to displace said cylinder into orifice-enlarging position, a tubular, resilient pressure-reaction element stressed between said cylinder and said piston assembly and transversely deformable to yieldably oppose said displacement with a substantially uniform counter-force of predetermined value for regulating the position of said cylinder and the size of said discharge orifice to establish

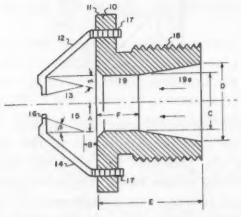
equilibrium between said force and said counter-force, and means for maintaining an equalized hydraulic pressure on opposite sides of the tubular wall of said pressure-reaction element whereby said element is energized solely in response to displacement of said cylinder.



3,904,126
FIRE SPRINKLER

Roger L. Allard, North Smithfield, R.I., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Oct. 11, 1973, Ser. No. 405,604
Int. Cl. B05b *1/26*
U.S. Cl. 239—502 **11 Claims**



1. A fire extinguishing apparatus for providing controlled distribution of a fluid within an enclosure having substantially vertical side walls, comprising:

a source of said fluid;

a nozzle having an orifice therethrough mounted in at least one of said side walls through which said fluid is discharged under pressure, said nozzle having a substantially horizontal axis;

deflector means coupled to said nozzle; and

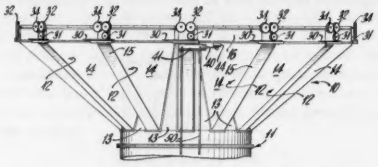
yoke means operably associated with said nozzle for disposing said deflector means in the path of said fluid discharge for effecting said controlled distribution whereby a fire in said enclosure is extinguished.

3,904,127
ENTRAINMENT NOZZLE

George Cash, 114 Bayberry Ln., Londonderry, N.H. 03053

Filed Feb. 13, 1974, Ser. No. 441,947
Int. Cl.² B05B *1/26, 1/32, 7/00*
U.S. Cl. 239—562 **6 Claims**

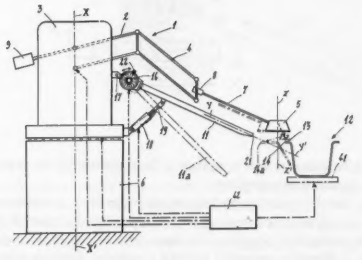
1. An entrainment nozzle for breaking up a column of hot gases into a plurality of ascending narrow walls of gases comprising means for dividing said column of gases into separate streams and diverting each of said streams to and through a corresponding one of a plurality of horizontal slots extending radially from the original direction of flow of said column, a pair of opposed vanes mounted for pivotal movement between a horizontal closed position and a vertical open position for regulating the widths of said slots to accomodate varying rates of gas flow, each said vane being pivotally mounted on an axial rod, which rod is connected to rack and pinion means for actuation of the vane between a horizontal and a vertical orientation upon movement of the rack with respect to the pinion.



3,904,128
METHOD AND DEVICE FOR ENAMELLING THE EDGES OF SANITARY ARTICLES

Andre Primault, Garches, France, assignor to Societe Generale de Fonderie, Paris, France

Filed May 18, 1973, Ser. No. 361,608
Claims priority, application France, June 27, 1972, 72.23187
Int. Cl.² B05B *15/08*
U.S. Cl. 239—587 **13 Claims**



1. A device for enamelling the edges of sanitary articles such as baths, said device comprising a movable and deformable support, a dusting unit carried by said support and comprising means to deliver powdered enamel, means to control the position in space of said dusting unit, said device further comprising a gas blowing nozzle carried by said support and so directed that the axis of said nozzle is adjacent the vertical centerline of said dusting unit and below the latter, so as to substantially intersect the flow of enamel dust, when said dusting unit is operated, and means for producing a gas stream through said nozzle toward said centerline.

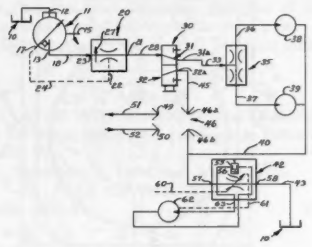
3,904,129
HYDRAULIC SYSTEM FOR VEHICULAR SPREADER

Allan L. Lorenc, Fairfax, Iowa, assignor to Highway Equipment Company, Cedar Rapids, Iowa

Filed Sept. 16, 1974, Ser. No. 506,558
Int. Cl.² A01C *3/06, 7/08*
U.S. Cl. 239—650 **7 Claims**

1. A hydraulic system for use with a vehicular spreader having a source of material to be spread, a conveyor beneath said material for conveying the same to a spinner driven by spinner motor means, said conveyor being driven by a conveyor motor, said vehicle further including a prime mover, the improvement comprising: a variable displacement pump driven by said prime mover and including a flow control input port; pressure-compensated flow control valve means receiving fluid from said pump means for delivering the same at a generally constant flow rate to an output port and including a bypass port; means for connecting the bypass port of said flow

control valve to the flow control inlet port of said pump; means connecting said spinner motor means in circuit with said pump; differential flow control valve means connected across said conveyor motor and in circuit with said spinner



motor means and responsive to a first control signal representative of the ground speed of the vehicle and a second feedback signal representative of the speed of said conveyor motor to adjust the flow of fluid to said conveyor motor.

3,904,130

MILL FOR GRINDING MINERALS

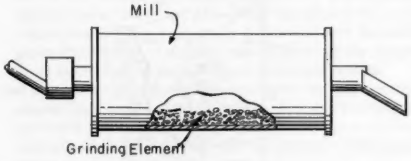
Pierre Delfosse, Paris, France, and Alfred Bosshard, Oftringen, Switzerland, assignors to Pluss-Staufer AG, Oftringen, Switzerland

Filed Sept. 27, 1973, Ser. No. 401,487

Claims priority, application Germany, Oct. 18, 1972, 2251099

Int. Cl. B02c *1/12*

U.S. Cl. 241—30 **20 Claims**



1. A mill for grinding minerals for use as a pigment or filler, the mill having grinding elements comprising 30 to 70% by weight of zirconium oxide, 0.1 to 5% by weight of aluminium oxide and 5 to 20% by weight of silicon oxide.

3,904,131

PRESSURE SEWER SYSTEM

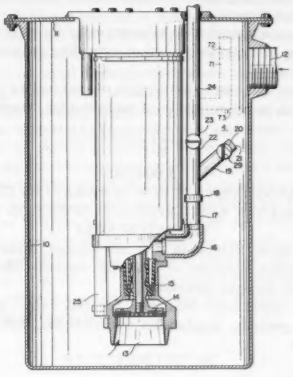
R. Paul Farrell, Jr., Schenectady; Richard C. Grace, Carlisle, and William J. Doyle, Delanson, all of N.Y., assignors to Environment/One Corporation, Schenectady, N.Y.

Filed Oct. 25, 1973, Ser. No. 409,716

Int. Cl. B02c *23/36*

U.S. Cl. 241—46.02 **33 Claims**

1. A pressure sewage transport system including in combination a plurality of sewage generating sites with each of said sewage generating sites including in combination at least one collection tank; grinder means having its inlet taking suction on the liquid sewage contents of the tank and discharging ground liquid slurry sewage from its outlet; pump means having its inlet connected to the outlet from said grinder means and providing a significant discharge flow of ground liquid slurry sewage under pressure from its outlet, a discharge passage connected to the outlet from said pump means for discharging ground liquid slurry sewage from said tank under pressure to one or more receiving points; outlet check valve means within said discharge passage permitting liquid sewage flow only in the direction from the outlet of said pump means to the receiving point and preventing backflow of pressurized liquid sewage; first conduit means connected at one end to said discharge passage and freely open at its other end to a source of venting gas; anti-siphon check valve means within said first conduit means for passing gaseous fluids through said first conduit means at least in a direction from said open end to said discharge passage and for preventing the passage of



liquid sewage from said one end to said open end of said first conduit means; at least one common pressure sewage main for connecting to at least one other sewage generating site and to at least one pressure sewage collection point; second conduit means connecting the outlet from said first check valve means to said common pressure sewage main and redundant check valve means connected in said second conduit means.

3,904,132

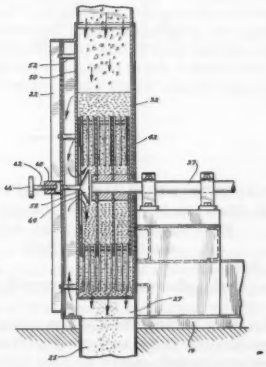
EXTERNAL REGULATION OF INTERNAL AIR VENT STRUCTURE FOR HAMMERMILL

Robert P. Olson, Rt. No. 2, Box 657, Mound, Minn. 55364

Filed May 8, 1974, Ser. No. 467,921

Int. Cl.[2] B02C *23/26*

U.S. Cl. 241—59 **2 Claims**



1. An air valve structure for a hammermill, having in combination

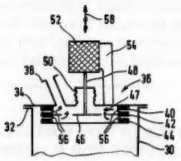
a housing having a grinding chamber therein,
a screen forming the side walls of said grinding chamber,
a plate member forming a front wall of said grinding chamber,
said plate member having a circular opening therein,
a conical closure member regulating the opening of said plate,
a door carried by said housing,
means mounting said plate member on said door in spaced relation thereto,
a rod carrying said closure member at its interior end and having its outer end portion extending outwardly of said door, and
means on said outer end portion of said rod for moving said closure member axially of said circular opening.

3,904,133

SEPARATION DEVICE FOR SEPARATING GRINDING ELEMENTS AND GROUND SUSPENSION IN AN AGITATOR MILL

Vladislav Bicik, Birsfelden, and Jan Kaspar, Muttenz, both of Switzerland, assignors to Gebruder Netzsch, Maschinenfabrik, Selb, Bayern, Germany

Filed Sept. 30, 1974, Ser. No. 510,771
Claims priority, application Switzerland, Sept. 28, 1973, 13981/73
Int. Cl.² B02C *17/18*
U.S. Cl. 241—69 **13 Claims**



1. A separation device for separating grinding elements and ground suspension in an agitator mill, comprising separation elements adjacent to the interior of the agitator mill having gaps between said separation elements of dimensions to block the passage of grinding elements between said separation elements, characterized in that the separation device includes at least one vibrator and at least one separation element connected to said vibrator which can be set into vibratory movement.

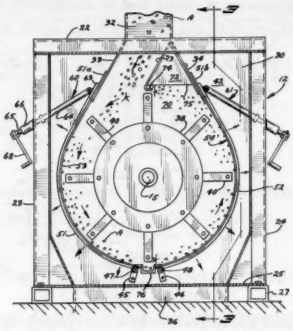
3,904,134

REGRINDING STRUCTURE FOR HAMMERMILL

Robert P. Olson, Rt. No. 2, Box 657, Mound, Minn. 55364

Filed May 8, 1974, Ser. No. 467,997
Int. Cl.² B02C *13/04*
U.S. Cl. 241—73 **4 Claims**

1. The grinding chamber of a hammermill, having in combination
an inlet chute feeding material into said grinding chamber,
a grinding member in said grinding chamber rotating at a speed substantially greater than the speed of travel of said material feeding thereinto,
a channel forming member extending transversely of said grinding chamber,
said channel member having a portion thereof deflecting upwardly increments of said material received therein passing through said grinding chamber and halting the forward movement thereof, and



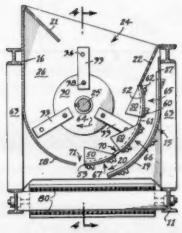
said grinding member impacting said upwardly deflected increments of material.

3,904,135

SOLID WASTE CHIPPER

Nelson H. Bogie, Rt. 1, Sledd Creek Rd., Gilbertsville, Ky. 42044

Continuation-in-part of Ser. No. 369,459, June 13, 1973, abandoned. This application Nov. 9, 1973, Ser. No. 414,357
Int. Cl.² B02C *13/09, 13/26, 13/282*
U.S. Cl. 241—86 **15 Claims**



1. A solid waste chipper comprising:
a. a housing having an inlet through which solid waste objects may be introduced for chipping, and an outlet through which chipped solid waste particles may exit,
b. at least one elongated chipper blade having opposite end portions,
c. means mounting said chipper blade for movement in a rotary path within said housing about a rotary axis,
d. means for rotating said chipper blade in said rotary path,
e. a first set of at least a pair of first anvil bars,
f. a second set of at least a pair of second anvil bars angularly spaced from said first set of anvil bars circumferentially about said rotary axis;
g. each of said anvil bars having a leading edge and a trailing edge merging at an intersecting portion,
h. means mounting each set of anvil bars in said housing so that the anvil bars in each set are spaced apart on opposite sides of said rotary path to form first and second slots, respectively, through which said chipper blade moves,
i. each of said first and second slots communicating with said outlet,
j. each of said leading edges sloping from said corresponding intersection portion away from the rotary axis of said shaft, so that said chipper blade moves sequentially through said slots from said leading edges toward said

trailing edges to normally engage a solid waste object on at least one of said leading edges at an acute shearing angle,

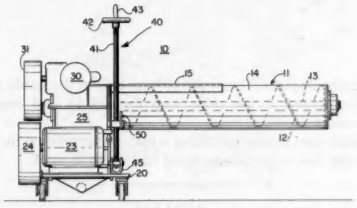
k. the circumferential spacing between said first and second sets comprising a port of predetermined size slightly larger than the axial dimension of either of said slots, through which solid waste particles may pass,

l. said port being in communication with said outlet.

3,904,136
GRANULATOR WITH IMPROVED ACCESSIBILITY

Donald B. De Noyer, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed May 1, 1974, Ser. No. 466,046
Int. Cl.² B02C *17/02*
U.S. Cl. 241—186 A **18 Claims**



1. A granulator apparatus for feeding and granulating plastic material comprising:

a bladed granulating mechanism,

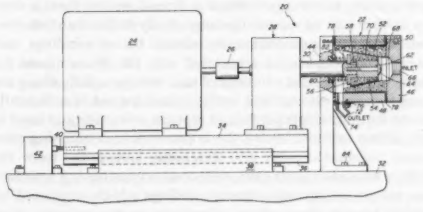
an elongated conveyor means for conveying material to the top of the bladed granulator mechanism, said conveyor means connected to the granulator mechanism by a pivot connection having a generally horizontal axis extending generally parallel to a plane passing through the longitudinal centerline of the elongated conveyor means,

and a mechanical means for interconnecting the conveyor means and the granulating mechanism for pivoting the conveyor means about the axis in a vertical plane normal to said horizontal axis to expose the interior of the granulating mechanism.

3,904,137
SEWAGE GRINDER

Gilbert E. Anderson, Fall River, Mass., and George V. Morris, Riverside, R.I., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 440,439, Feb. 7, 1974, abandoned.
This application Feb. 14, 1975, Ser. No. 550,068
Int. Cl.² B02C *2/00*
U.S. Cl. 241—259.1 **15 Claims**



1. A blender for grinding a mixture of substances drawn from the class of substances found in raw sewage, said class of substances including pebbles, metal, hair-like fibrous material and plastic material, said blender comprising:

first and second grinding members having respectively first and second abrasive surfaces thereof, said surfaces being of similar geometric form to permit the nesting of said first member within said second member;

means for moving one of said abrasive surfaces relative to the other of said abrasive surfaces;

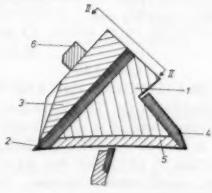
means for guiding particulate matter between said first and said second abrasive surfaces, said first and said second members being spaced apart a distance sufficient to admit entry of the substances in said class of substances between said first and said second abrasive surfaces; and

said first abrasive surface being composed of an abrasive ceramic material having pores therein, said pores being of varying dimensions, smaller ones of said pores being interleaved among larger ones of said pores, said abrasive ceramic material being harder than said metal of said raw sewage to permit a grinding thereof, said abrasive ceramic material being structured to permit a breaking off of particles thereof in response to pressure exerted between said first and said second members by a pebble of said raw sewage entrapped between said first and said second members, said larger pores being sufficiently large to prevent glazing by said plastic material, there being a sufficient number of said smaller pores between said larger pores having cutting edges for grinding said hair-like fibrous material.

3,904,138
HOLDING DEVICE FOR KNIFE SETS IN A SHREDDING DEVICE

Gerhard Maier, Brackwede, and Hans-Joachim Mruck, Bielefeld, both of Germany, assignors to B. Maier KG, Brackwede, Germany

Filed Apr. 11, 1974, Ser. No. 460,185
Claims priority, application Germany, Apr. 13, 1973, 2318731
Int. Cl.² B02C *18/18*
U.S. Cl. 241—286 **6 Claims**



1. In a knife cage assembly, a drum-shaped knife cage, a multiplicity of knife crosspieces disposed on the periphery of said drum-shaped knife cage and having respective knife support surfaces extending in axial direction of said drum-shaped knife cage and disposed at an acute angle to a radial plane through said drum-shaped knife cage, a knife set comprising a knife holder plate and a shredding knife held thereby supported on one of said knife support surfaces, said knife holder plate having a surface facing away from said knife, a tensioning bar disposed on said surface of said knife plate and extending in longitudinal direction of said knife, said tensioning bar being fastened at both ends thereof to said knife holder plate and being braced at least at a central region thereof against said knife holder plate.

3,904,139
DRUM-SHAPED KNIFE CAGE WITH REPLACEABLE KNIFE SETS

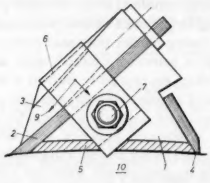
Gerhard Maier; Werner Grube, both of Brackwede, and Johannes Schrage, Brackwede-Holtkamp, all of Germany, assignors to B. Maier KG, Brackwede, Germany

Filed Apr. 11, 1974, Ser. No. 460,186

Claims priority, application Germany, Apr. 13, 1973, 2318730

Int. Cl.[2] B02C *18/18*

U.S. Cl. 241—286 **4 Claims**



1. Drum-shaped knife cage assembly comprising a drum-shaped knife cage, a multiplicity of knife crosspieces disposed on the periphery of said drum-shaped knife cage having respective knife support surfaces extending in axial direction of said drum-shaped knife cage and disposed at an acute angle to a radial plane through said drum-shaped knife cage, a knife set comprising a knife holder plate and shredding knives held thereby supported on one of said knife support surfaces, and clamping means engaging said knife crosspiece for clamping the respective knife set against the respective knife support surface of said knife crosspiece; said knife holder plate being beveled at both ends thereof to form a wedge surface thereat, said wedge surface, as viewed in cross section parallel to the longitudinal axis of the knives and perpendicular to the knife support surface, defining means with said knife support surface an acute angle, said clamping means comprising a separate clamping device at each end of a respective knife holder plate, each of said clamping devices having a wedge counterbearing surface corresponding to said wedge surface of said knife holder plate, at least one of said clamping devices comprising a releasable clamping jaw.

3,904,140
APPARATUS FOR CHANGING THE END STRUCTURAL CONFIGURATION OF THREAD PACKAGES

Peter Hermanns, Stommeln, Cologne, Germany, assignor to FMN Schuster & Co., Hurth-Efferen, Germany

Filed Nov. 7, 1973, Ser. No. 413,727

Claims priority, application Germany, Nov. 10, 1972, 2255065; June 18, 1973, 2330932

Int. Cl. B65h *54/32*

U.S. Cl. 242—43.1 **14 Claims**

1. An apparatus for changing the end structural configuration of thread packages formed on winding machines of synthetic or textile threads, comprising:

a. a reverse thread roller, a guide rail, a friction roller, a spool driven by the friction roller about means defining a rotational axis and means for delivering thread to the spool,

b. said thread delivery means including a thread guide element movably mounted for back and forth motion along the length of the spool by means of the reverse thread roller,

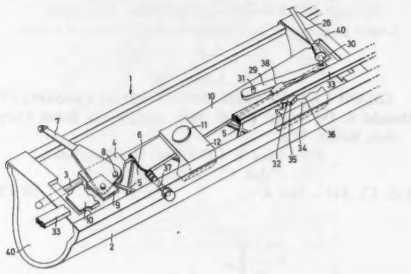
c. said thread guide element including means contacting the guide rail during said back and forth movement,

d. said guide rail being pivotally mounted,

e. means responsive to lateral movement of said rotational axis means as the diameter of the thread package increases about the spool and

f. a control mechanism disposed between the responsive means and the guide rail to influence the pivotal deflection of the guide rail,

e. said control mechanism including a cam means and a lever means connected at one end to the guide rail at a



point displaced from the pivotal axis of the guide rail and connected at the other end thereof to said responsive means,

h. said cam means including a cam surface being in contact with the lever means along its length thereof.

3,904,141
THREAD SUPPLY DEVICE FOR INTERMITTENT THREAD SUPPLY TO TEXTILE MACHINES

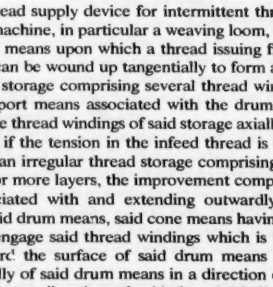
Karl Isac Joel Rosén, Hjo, Sweden, assignor to Aktiebolaget IRO, Ulricehamn, Sweden

Filed Mar. 8, 1974, Ser. No. 449,261

Claims priority, application Germany, Mar. 13, 1973, 2312508

Int. Cl.[2] B65H *51/20*

U.S. Cl. 242—47.12 **7 Claims**



1. In a thread supply device for intermittent thread supply to a textile machine, in particular a weaving loom, comprising thread drum means upon which a thread issuing from a storage bobbin can be wound up tangentially to form an intermediate thread storage comprising several thread windings, and thread transport means associated with the drum means for displacing the thread windings of said storage axially along the drum means if the tension in the infeed thread is sufficiently low to form an irregular thread storage comprising at least in part of two or more layers, the improvement comprising cone means associated with and extending outwardly from the surface of said drum means, said cone means having a surface adapted to engage said thread windings which is tapered inwardly toward the surface of said drum means and which extends axially of said drum means in a direction opposite to the displacement direction of said thread windings by said transport means, said cone means being slidably displaceable relative to said drum means in the axial direction thereof, and biasing means coacting with said cone means for urging same

axially of said drum means in said direction opposite to the displacement direction of said thread winding by said transport means.

3,904,142

MACHINES FOR INTERCONNECTING CONTINUOUS WEBS

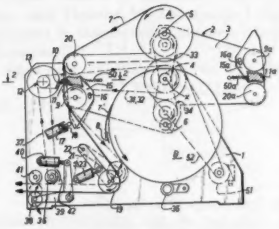
Louis G. Corse, Orleans-Cedex, France, assignor to Societe d'Etudes de Machines Speciales, France

Filed Oct. 18, 1973, Ser. No. 407,672

Claims priority, application France, Sept. 13, 1972, 72.32455

Int. Cl. B65h *19/16*

U.S. Cl. 242—58.3 8 Claims



1. Apparatus for interconnecting two webs of material, incident to travel thereof, comprising;

a frame defining a horizontal axis; support means mounted on the frame for pivotal motion about said axis; first and second mandrels each pivotally mounted on said support means for supporting and rotating respectively a first web reel for unwinding a first travelling web of material at a high, peripheral, linear speed of travel, and a second web reel in readiness for delivery of a second web;

means for cutting off said first travelling web from said first web reel, when said first web reel approaches being totally unwound, to produce a transverse edge across the web, said means comprising a counter-blade mounted on said support means for movement between an inactive position and a cutting position of the counter-blade; a driving shaft journaled on said frame, parallel to said axis; a motor for driving the shaft; rotary cutter means, comprising, a blade holder mounted on said shaft for rotation therewith; and a cutting blade mounted on said blade holder to cooperate with said counter-blade in the cutting position of the latter by cutting said first travelling web to produce said edge;

a transmission system, comprising, first and second transmission wheels; first and second clutches for coupling said first and second transmission wheels respectively, to said driving shaft to drive them; first and second motion transmission means for transmitting motion from said first and second transmission wheels, respectively, to the mandrels of said first and second web reels; first and second brake means for said first and second transmission wheels and thereby for said first and second mandrels and web reels, respectively; and control means for said first and second clutch means and for said first and second brake means, thereby enabling equalizing the linear, peripheral speeds of said first and second web reels for splicing the first and second webs;

means for splicing said webs, comprising, means for juxtaposing an edge of the second web with the transverse edge of the first web and applying at least one adhesive band to the two edges while beginning the rotation of the second web reel and ending the rotation of the first web reel by said first and second clutches and brakes; and

means for effecting the pivotal motion of said support, upon the splicing of said bands, and for thereby converting the second web reel into a web reel for further delivery of a travelling web of material.

3,904,143

REELING-UP DRUM

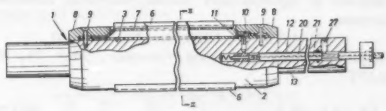
Mats Ove Kullander, Saffle, Sweden, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 16, 1973, Ser. No. 360,827

Claims priority, application Sweden, May 19, 1972, 6574/72

Int. Cl. B65h *75/24*

U.S. Cl. 242—72 B 6 Claims



1. An improved reeling-up drum of the kind intended to retain the winding sleeve supporting paper rolls and similar material wound onto sleeve-like cores, comprising grooves formed in the reeling-up drum, expansible means in the form of hoses inserted in said grooves, an axial channel formed in one of the two trunnions of said reeling-up drum, junction channels interconnecting said hoses and said axial channel, and a pressure element positioned in each one of said grooves, said hoses being arranged, when inflated by pressurized air supplied through said axial channel and said junction channels, to displace said pressure elements radially outwards into engagement with the inner circumference of said winding sleeve, a body of resilient material displaceable in said reeling-up drum axial channel, and a rod-like pressure member adapted to move and expand said resilient body to effect closure of said junction channel mouths into said axial channel.

3,904,144

EXPANSIBLE MANDREL

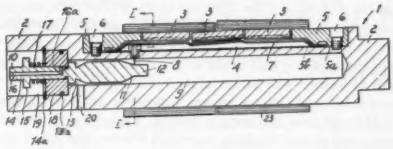
Giovanni Gattrugeri, Viale col di Lana 2, Milan, Italy (20136)

Filed July 3, 1972, Ser. No. 268,289

Claims priority, application Italy, July 2, 1971, 26552/71; July 2, 1971, 26553/71

Int. Cl.[2] B65H *75/24;* B23B *31/40*

U.S. Cl. 242—72 B 5 Claims



1. An expansible mandrel comprising a shaft, a first axial hollow chamber in said shaft, said chamber selectively communicating with a source of fluid under pressure, at least two longitudinal slots on the periphery of said shaft and being circumferentially spaced apart, pressing elements received in said slots, said slots and said pressing elements having cooperating means to guide said pressing elements radially with respect to the shaft, an inflatable air hose member received in each of said slots, said air hose members being located beneath said pressing elements and being supported on said shaft and closed at the ends thereof to allow said air hose members to be inflatable for urging said pressing elements radially outward, each hose having passage means providing pneumatic communication between the interior of the hose member and said first chamber,, wherein the improvement comprises each hose having valve means controlling the admission of fluid from said first chamber through said first passage

means into the interior of said hose member for inflation thereof and for controlling the exhaust from said air hose member interior into said chamber for deflation thereof the valve means of each hose member being independent of the pressure condition of any other hose member.

3,904,145

APPARATUS FOR STEPWISE TRANSPORT OF WEBS IN PHOTOGRAPHIC COPYING MACHINES OR THE LIKE

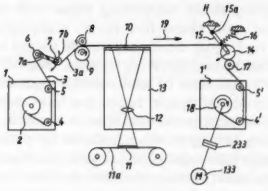
Siegfried Steinberger, Munich; Erich Nagel, Anzing; Ernst Biedermann, Munich; Mathias Pflugbeil, Baldham; Karl Dreher, and Adolf Fleck, both of Munich, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed May 25, 1973, Ser. No. 364,080

Claims priority, application Germany, May 31, 1972, 2226577

Int. Cl.[2] B65H *23/10*

U.S. Cl. 242—75.2 **20 Claims**



1. Apparatus for tightly packing the convolutions of elongated web material, comprising a source of web material, said web material having a leader; rotary takeup means connected with said leader; means for rotating said takeup means in a direction to collect and convolute the web material on said takeup means; advancing means actuatable to transport the web material stepwise along a predetermined path extending from said source to said takeup means; a friction brake for braking the web material intermediate said advancing means and said takeup means in response to an interruption of actuation of said advancing means while said takeup means continues to rotate in said direction whereby said takeup means packs the convoluted web material as a result of further rotation of said takeup means in said direction upon application of said brake, said brake comprising first and second braking members disposed at the opposite sides of said path; means for looping the web material intermediate said advancing means and said brake during actuation of said advancing means; and means for applying said brake in response to a reduction of the length of looped web material as a result of collection of web material by said takeup means following an interruption of actuation of said advancing means, including a device for moving one of said braking members toward the other of said braking members to thereby bias the web material against said other braking member in response to said reduction of the length of looped web material.

3,904,146

ELECTROMAGNETICALLY CONTROLLED SEAT BELT RETRACTOR MECHANISM

Jeffrey A. Erion, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed June 10, 1974, Ser. No. 478,023

Int. Cl.[2] B65H *75/48*

U.S. Cl. 242—107.4 **1 Claim**

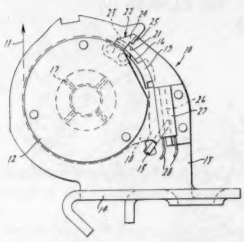
1. An electromagentically controlled seat belt retractor mechanism having a frame journalling a spring-loaded reel to which a seat belt is coupled for protraction and retraction,

the reel having fixed thereto at least one toothed ratchet wheel,

a pivotally mounted locking bar biased for movement into engagement with the ratchet wheel to lock the wheel against rotation in protraction direction,

a cam disk biased axially of the reel into frictional engagement with the side face of the ratchet wheel,

the cam disk being rotatable by the ratchet wheel to a position in which a blocking portion thereon lies in the path of the locking bar to block the latter against movement into ratchet wheel locking engagement whereby the reel remains freely movable in either protracting or retracting directions,



wherein the improvement comprises:

a solenoid mounted on the retractor mechanism frame externally of one side of the latter and a contact member mounted on the cam disk,

the contact member having a part thereof projecting outwardly through a slot in the one side wall in position to engage the solenoid when the cam disk blocking portion is in locking bar movement blocking position,

the contact member when in solenoid engaging position being magnetically locked to the solenoid upon the latter being energized, thereby immobilizing the cam disk in locking bar blocking position and maintaining the free movement condition of the reel,

and a source of current for energizing the solenoid.

3,904,147

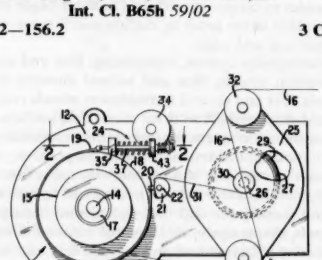
SPRING SYSTEM ASSEMBLY FOR TENSION COMPENSATING CONTROL DEVICE

Charles M. Taitel, Parsippany, and Ralph L. Ryan, Lake Parsippany, both of N.J., assignors to Compensating Tension Controls, Inc., Orange, N.J.

Filed Aug. 14, 1974, Ser. No. 497,259

Int. Cl. B65h *59/02*

U.S. Cl. 242—156.2 **3 Claims**



1. A spring system assembly for a tension compensating control device having a brake band operated by a control unit connected to one end of the brake band to act against a brake drum carried by a spindle for a roll of material, said spring system assembly comprising a bracket secured to a frame member, a tube having one end secured to said bracket and having a radially extending flange on the other end, said tube

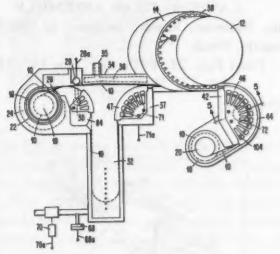
being axially adjustable with respect to said bracket, a washer mounted on said tube, a low-rate overload compression spring on said tube acting against said bracket and normally urging said washer against said flange, a rod extending through said tube having a first end attached to the other end of the brake band and having a second end, a stop member adjustably positioned on said second end, a spring compressing member slidably mounted on said rod and having an axial element positioned to contact said washer, and a high-rate Prony brake compression spring on said rod acting against said stop member and said spring compressing member.

3,904,148

CONTROL FOR SELF-THREADING TAPE IN A HELICAL PATH

Samuel P. Cloud; Clement H. Kalthoff; William J. Rueger, all of Boulder, and Timothy W. Thompson, Longmont, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 25, 1974, Ser. No. 464,259
Int. Cl.[2] B65H *17/32*
U.S. Cl. 242—182 **10 Claims**



1. Apparatus for controlling the self-threading of magnetic tape about a rotating magnetic head through a channelized thread path that wraps at least a portion of the path of the rotating head, said apparatus comprising:

means for pushing the tape from a supply spool through the thread path to a vacuum-attach take-up hub;

means for sensing the passage of the tape leading edge from the spool to the entrance in the thread path;

means connected with the spool and responsive to said sense means for counting degrees of rotary motion by the supply spool whereby the length of tape pushed from the spool into the thread path, after the tape leading edge is sensed by said sense means, may be metered as the tape is pushed along the thread path;

means connected to said counting means for controlling said pushing means to vary the speed and direction of motion of the tape through the thread path and during attachment to the take-up hub as a function of tape leading edge position in the thread path.

3,904,149

CASSETTE LOADING APPARATUS FOR USE IN CASSETTE TAPE RECORDER

Shoji Suzuki, Iwaki, Japan, assignor to Alps Motorola Inc., Tokyo, Japan

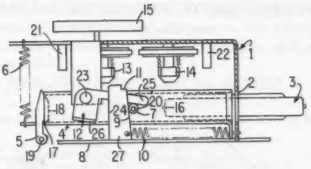
Filed Aug. 23, 1974, Ser. No. 500,025
Claims priority, application Japan, 48-101393
Int. Cl.[2] G11B *23/10, 15/68*
U.S. Cl. 242—198 **8 Claims**

1. A cassette loading mechanism for use in a cassette tape recorder/reproducer device including a housing having an opening adapted to receive a cassette tape cartridge and having a tape drive mechanism engageable with the tape cartridge to drive the same, including in combination:

a holding frame within the housing adapted to receive the cassette cartridge, said holding frame being movable between a first position aligned with the opening when the cassette cartridge is inserted into the recorder/reproducer device and a second position wherein the cassette cartridge is held in a play position against the tape drive mechanism,

retention means engageable with said holding frame to hold the same at said first position, said retention means being disengageable from said holding frame upon the insertion of the cassette cartridge into said holding frame,

biasing means engageable with said holding frame to move said holding frame from said first position to said second position upon disengagement of said retention means from said holding frame,



projection means mounted to said holding frame,

lever means pivotally mounted in the housing and engageable with said projection means, and

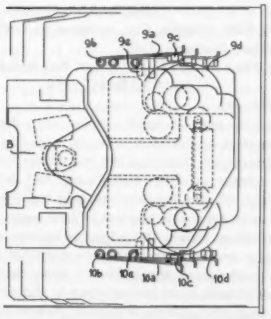
control means movable between an outward position wherein said control means engages said projection means to position and hold said holding frame in said second position and an inward position wherein said control means engages said lever means to pivot the same, said pivotal movement causing said lever means to engage said projection means and move said holding frame to said first position wherein the cassette cartridge is held in position for removal through the opening in the housing and said retention means is engageable with said holding frame to hold the same at said first position.

3,904,150

CASSETTE TAPE RECORDER

Pierre Pinot, Saint Germain Les Arpajon, France, assignor to Societe de Fabrication d'Instruments de Mesure S.F.I.M., Massy, France

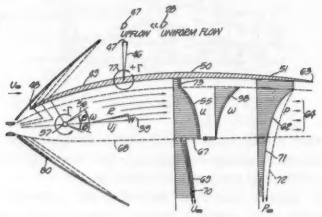
Filed Mar. 16, 1973, Ser. No. 338,714
Claims priority, application France, Mar. 15, 1972, 72.09060
Int. Cl. G03b *1/04;* **G11b** *14/32, 23/04*
U.S. Cl. 242—199 **4 Claims**



1. A magnetic tape cassette comprising:

a. a relatively flat case having two parallel spaced walls, front and rear edges between said walls, and an opening in one of said edges,
b. a cover adapted to fit over a portion of said walls adjacent to said opening so as to close said opening, and
c. means interconnecting said cover and case permitting said cover to be removed from said opening to expose the latter without detaching said cover from said case, said means including a groove in one of said cover and case and a peg in the other of said cover and case, said peg being captive in and slidable along said groove.

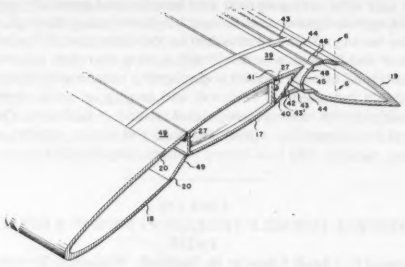
3,904,151
SUPERSONIC UPFLOW WING
Scott C. Rethorst, South Pasadena, Calif., assignor to Vehicle Research Corporation, South Pasadena, Calif.
Filed Mar. 16, 1973, Ser. No. 342,151
Int. Cl. B64c *21/04*
U.S. Cl. 244—42 CC **10 Claims**



1. An aircraft wing to fly at supersonic speeds, said wing comprising:
a lower surface element which has a curvature concave downwards on at least a portion of its extent yet has a net positive angle of attack with respect to the flight direction; and
a manifold including a nozzle, said manifold extends substantially the entire span of said lower surface element, and said nozzle is shaped to emit a supersonic jet of fluid at a pressure greater than atmospheric below said surface element, providing a sheet of said fluid under essentially the entire extent of said lower surface element, constituting an expansion field to cancel the asymmetric compression field from said surface element, transforming this compression energy into the rotational form of vorticity to provide a downstream upflow to said surface element to reduce its angle of attack and drag.

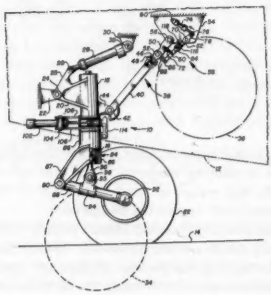
3,904,152
VARIABLE AREA, VARIABLE CAMBER WING FOR AIRCRAFT
T. Gardner Hill, Atlanta, Ga., assignor to Lockheed Aircraft Corporation, Burbank, Calif.
Filed Mar. 13, 1974, Ser. No. 450,668
Int. Cl.[2] B64C *3/54*
U.S. Cl. 244—43 **10 Claims**

1. A variable area, variable camber wing for aircraft comprising a central, spanwise box beam, a leading and a trailing edge section disposed around the respective fore and aft ends of said box beam, and an engagement and drive mechanism between each of said leading and said trailing edge sections and said box beam for movement of said sections to and from extreme positions where the adjacent spanwise edges of said sections abut one another to thereby completely enclose said box beam and where the adjacent spanwise edges of said sections are remote from one another to thereby uncover said box beam and extend from opposite, chordwise ends thereof, each said engagement and drive mechanism including a connection at and along the upper and lower extremity of the associated section to thereby react the loads from said sections simultaneously at both top and bottom chordwise edges



of said sections and to establish the path of movement of said sections to and from their extreme positions corresponding to the contour of said sections.

3,904,153
STEERABLE AND RETRACTABLE AIRCRAFT NOSE LANDING GEAR ASSEMBLY
John Watts, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.
Filed Feb. 25, 1974, Ser. No. 445,073
Int. Cl.[2] B64C *25/26*, *25/50*
U.S. Cl. 244—50 **7 Claims**



1. An aircraft nose landing gear assembly comprising:
shock absorbing means suitable for absorbing the shock applied to aircraft when its nose wheels come in contact with the ground upon landing;
a cylindrical housing surrounding said shock absorbing means;
a mounting mechanism for affixing said cylindrical housing to said aircraft;
wheel support means for supporting aircraft nose wheels in a manner such that said nose wheels are free to move and control the direction of movement of said aircraft when said nose wheels are in contact with the ground, said wheel support means including a wheel collar mounted about one end of said cylindrical housing;
aircraft steering means for controlling the movement of said wheel support means when attached thereto, said aircraft steering means including a steering collar mounted about said cylindrical housing adjacent to, but spaced from, said wheel collar; and
manual attachment means for attaching said steering collar to, and detaching said steering collar from, said wheel collar, said manual attachement means comprising a link detachably connected between said steering collar and said wheel collar, said link being formed and connected in a manner such that when said steering collar is de-

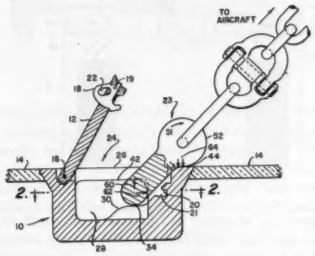
tached from said wheel collar, said wheel support means and the aircraft wheels it supports are free to rotate through any desired arc without causing any corresponding movement of said aircraft steering means.

3,904,154

SECURING SYSTEM FOR JET ENGINE TESTING OF AIRCRAFT

Frederick W. Jones, Upper Marlboro, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 13, 1974, Ser. No. 469,187
Int. Cl.[2] B60P *7/08*; **B63B** *35/50*; **B64F** *1/12*; **B65J** *1/22*
U.S. Cl. 244—110 R **3 Claims**



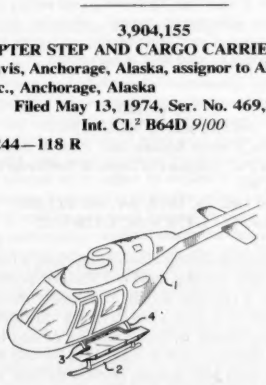
1. Apparatus for securing aircraft to the deck of an aircraft carrier comprising a first cup-shaped member adapted to be installed in the deck of the carrier with the upper surface of said member flush with said deck, said cup-shaped member having a movable cover portion which when opened exposes a slot type aperture leading to a receiving cavity, said receiving cavity having a seat portion which includes a pair of spaced inclines leading to the front wall of said cavity, and a second member of T-shape having integral upstanding and cross member portions, said cross member portion being of proper size to permit insertion through said slot type aperture, positioning within said receiving cavity and pulling up said inclines to contact said front wall and the underside of said upper surface, said upstanding member being rotatable downward to contact the front side of said slot type aperture, thereby providing a multipoint contact between said cup-shaped member and said T-shape member to distribute the forces throughout said cup-shaped member.

3,904,155

HELICOPTER STEP AND CARGO CARRIER ASSEMBLY

Gene Chavis, Anchorage, Alaska, assignor to Alaska-Sky Craft Co., Inc., Anchorage, Alaska

Filed May 13, 1974, Ser. No. 469,291
Int. Cl.[2] B64D *9/00*
U.S. Cl. 244—118 R **8 Claims**



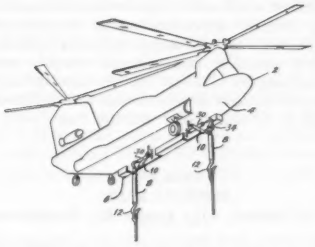
1. In combination with a helicopter type aircraft having a landing gear undercarriage and a door; a cargo carrier and step assembly comprising; an elongated substantially rigid cargo carrying frame, means to secure said frame to said undercarriage such that said frame extends parallel to the longitudinal axis of the aircraft adjacent the door, means on said frame forming a generally horizontal support surface, an outboard rail member extending along the outboard edge of said frame, and means connecting said rail to said frame for swinging movement between raised and lowered positions extending respectively above and below said surface.

3,904,156

EXTERNAL LOAD STABILIZATION APPARATUS

James H. Smith, Springfield, Pa., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed July 11, 1974, Ser. No. 487,837
Int. Cl.[2] B64D *9/00*
U.S. Cl. 244—118 R **13 Claims**

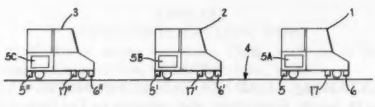


1. A stabilization mechanism for cargo load carriers of the type which are suspended beneath an aircraft by means of risers, comprising: load-carrying arm support means positioned in the base of the aircraft; a pair of retractable load-carrying arms (load arms); universal joint means positioned within the load arm support means, and adapted to receive the upper ends of each load arm so that the two load arms become pivotally connected spaced pendants; load arm drive means adapted to move each load arm within its universal joint means both longitudinally and laterally relative to the aircraft; riser attachment means pivotally connected to the lower end of each load arm and adapted to receive and move linearly with a riser attached both thereto and to the load carrier; sensor means engaging each load arm for sensing motion of the load arm relative to a reference line through the aircraft base, and for generating a signal as a function of said motion; sensor means engaging each riser attachment means for sensing motion of the risers relative to their respective load arms, and for generating a signal as a function of said motion; load arm actuating means adapted to engage and to operate each load arm drive means to move the load arms both longitudinally and laterally; electronic circuit means responsive to the load arm engaging sensor means and the riser engaging sensor means, transmitting corrective electrical signals to each load arm actuating means, driving the load arms to damp pendular load motion; and yaw damping means inhibiting oscillation of a load about a vertical axis through differential front and rear arm motion.

3,904,157
ARRANGEMENT FOR MEASURING THE DISTANCE BETWEEN TWO SUCCESSIVE OBJECTS

Burkhart Kühl, Ottobrunn, Germany, assignor to Messerschmitt-Bölkow-Blohm G.m.b.H., Munich, Germany

Filed Feb. 27, 1974, Ser. No. 446,269
Claims priority, application Germany, Mar. 7, 1973, 2311150
Int. Cl.² B61L 25/00
U.S. Cl. 246—63 C 3 Claims

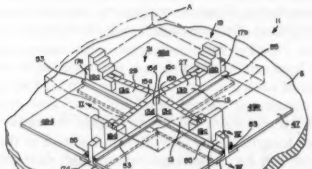


1. In an arrangement for measuring the distance between two successive track-carried objects, each being equipped with transmitters and receivers and transmitting an electrical signal of a defined magnitude, said signal being transmitted by a transmitter of the forward object to a receiver of the next following object, said receiver having a defined sensitivity, said transmitters and receivers being coupled through a damped medium in the form of an electrically conductive line having a defined attenuation characteristic, the improvement comprising complex impedance means mounted on each object coupled with said line to place a passive reflection point for electrical signals on said line, said complex impedance means being coupled with said line between the coupling of said transmitter on each object with said line and the coupling of said receiver on each object with said line.

3,904,158
SUPPORT BASE

Sherman M. Michael, 1453 Ranger Dr., Southhaven, Miss. 38671

Filed May 24, 1974, Ser. No. 473,279
Int. Cl.² F16M 11/38
U.S. Cl. 248—23 12 Claims

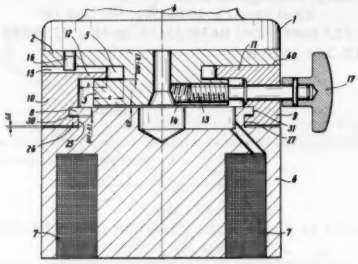


1. A supporting base for restingly supporting various objects thereon, said base comprising a plurality of radially extending arms having inner and outer ends thereto with the inner ends thereof being joined one to the other, a plurality of support blocks respectively being provided with downwardly directed channels, said channels of said support blocks slidably engaging respective ones of said arms to allow movement of said support blocks along said arms and leveling means for leveling the object being supported upon said base, said leveling means having a capability of compensating, within limits, for a non-level surface subjacent said support base.

3,904,159
ADJUSTABLE SUPPORTING STRUCTURE FOR POWER TOOLS OR THE LIKE

Lothar Pahlow, Geesthacht, Germany, assignor to Wilhelmsburger Maschinenfabrik Hinrichs & Sohn, Geesthracht, Germany

Filed Dec. 6, 1974, Ser. No. 530,342
Claims priority, application Germany, May 9, 1974, 2422392
Int. Cl.² E21C 5/00
U.S. Cl. 248—23 10 Claims



1. A supporting structure for power tools, such as boring machines or the like, comprising a foot having means to secure said foot to a body, said foot having a first circumferential groove and an endface; a supporting member arranged to support a boring machine or the like and including a base closely adjacent said endface and having a second circumferential groove; a ring-shaped clamping device comprising a pair of arcuate sections provided with first flanges extending into said first groove and with second flanges extending with radial clearance into said second groove to hold said base against movement away from said foot, said sections of said ring-shaped clamping device being adapted to be moved into and out of clamping engagement with said foot; coupling means connecting said sections with said base for angular movement therewith; and self-locking adjustment means comprising a rotary portion provided on one of said sections and extending substantially normal to the axis of said supporting member and a mating section provided in said base and arranged to move with said base sidewise in response to rotation of said rotary portion, said sections, said base and said foot being arranged and constructed so that even after said sections are brought in clamping engagement with said foot, said base may be moved sidewise relative to said foot by turning said rotary portion of said self-locking adjustment means, whereby during such sidewise adjustment of said base undesired rotary movement of said base relative to said foot is prevented.

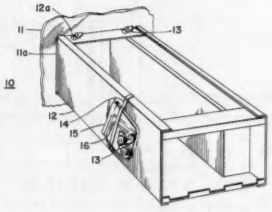
3,904,160
INSTRUMENT MOUNTING

Joseph M. Biddle, Center Square, and Paul B. Binder, North Wales, both of Pa., assignors to Leeds & Northrup Company, North Wales, Pa.

Filed Oct. 10, 1974, Ser. No. 513,808
Int. Cl.² G17B 9/04; G12B 9/02
U.S. Cl. 248—27 13 Claims

1. An instrument mounting means comprising a bushing and cam assembly, said bushing having a flanged portion of enlarged diameter at one end and an exteriorally threaded portion at the other end, said cam having a threaded portion threadably engaging said threaded portion of said bushing to an extent such that said cam is supported on said bushing in spaced relation with said flanged portion thereof, releasable means tending to hold said cam in fixed position on said bushing, and said bushing including tool receiving means whereby when an instrument housing having flange structure at the front end thereof is inserted in a panel cut-out and said bush-

ing and cam assembly is positioned in an aperture in a wall of said housing adjacent said flange with a wall portion of said housing disposed between said flanged portion of said bushing and said cam, a tool may be used to rotate said bushing and cam assembly to cause said cam tightly to engage the panel and draw the flange structure of the housing tightly against the



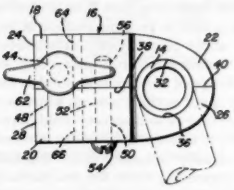
panel and upon further rotation of the tool overpower said means tending to hold said cam in fixed position on said bushing thereby to rotate said bushing relative to said cam and draw said cam and said flanged portion of said bushing toward one another to bring said bushing and cam into clamping engagement with the wall portion of said instrument housing.

3,904,161

CLAMP FOR ATTACHING UMBRELLA TO LAWN CHAIR

Norman D. Scott, Rt. 2, Box 409, Dayton Beach, Fla. 32019

Filed Aug. 15, 1974, Ser. No. 497,631
Int. Cl.[2] F16B *2/02*
U.S. Cl. 248—43 **6 Claims**



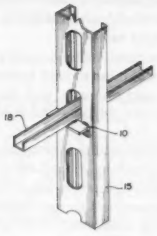
1. A clamp including a pair of elongated clamp blocks each including an inner side and an outer side and opposite ends, adjacent one pair of corresponding ends of said blocks there extends open ended laterally outwardly opening generally semi-cylindrical transversely extending recesses therein, opening laterally outwardly through said inner sides, said blocks being relatively positioned with said inner sides disposed in engagement and said recesses registered with and opening laterally toward each other to define a generally cylindrical cavity open at its opposite ends, the other pair of corresponding ends of said blocks each having an open ended elongated generally rectangular channel shape recess; with said channel shaped recesses extending across the end surfaces with the channel openings intersecting the end surfaces of each block and with said channel recesses extending axially aligned along a path disposed transverse to the center axis of said cavity, the portions of one of said blocks defining one side of the corresponding channel recess having a set screw threaded therethrough with said set screw projecting into said corresponding channel recess from one side thereof and extending transversely of said corresponding channel recess, and means connected between said blocks operative to clamp said blocks together.

3,904,162

CLIP ATTACHABLE TO METAL STUD FOR SUPPORT OF LATERAL BRACING

Theodore S. O'Konski, Wheeling, W. Va., assignor to Wheeling-Pittsburgh Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 385,457, Aug. 3, 1973, Pat. No. 3,854,192. This application June 7, 1974, Ser. No. 477,181
Int. Cl.[2] F16M *13/00*
U.S. Cl. 248—223 **4 Claims**



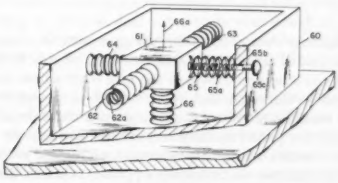
1. A clip for attachment to metal studding to provide support for a lateral bracing element extending through a slot in the stud, said clip comprising a metal angle bracket having two legs disposed at a right-angle to each other, one of said legs having two oppositely extending tabs struck-up out of the level of the leg, said tabs being on a line parallel to the other leg and having their bight portions spaced apart symmetrically with respect to a line midway of the ends of the leg, said tabs being placed under tension, when the clip is installed on the studding by turning from a vertical to a horizontal position, by the web of the studding at opposite sides of a slot in the studding entering between said tabs and the leg out of which they are struck, said clip being maintained in position on the studding by the gripping action of the tabs on the web of the studding.

3,904,163

LASER-SIGHT AND COMPUTER FOR ANTI-AIRCRAFT GUN FIRE CONTROL SYSTEM

Leonard Kendy, Palos Verdes Peninsula, and Richard L. Frey, Los Angeles, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Division of Ser. No. 209,268, Dec. 17, 1971, Pat. No. 3,845,276. This application July 12, 1974, Ser. No. 488,119
Int. Cl.[2] G06G *7/78;* **F41F** *3/04;* **F16F** *7/00*
U.S. Cl. 248—358 R **2 Claims**



1. In a gun fire control system wherein sighting means for measuring angular velocities of a target are mounted with the gun being controlled on a rotatable platform, vibration isolation means for maintaining said sighting means irrotational with respect to said platform comprising:

a first support member rigidly attached to said platform, said support member being open at its top; a second support member centrally positioned within said first support member for supporting said sighting means;

said second support member being attached to said first support member by resilient attaching means lying along

each of three mutually orthogonal axes, one of said axes being perpendicular to the plane of said platform;

c. said resilient attaching means for attaching said second support member along said one axis comprising a bellows member having its longitudinal axis lying along said one axis and having one of its ends attached to said first member and the other of its ends attached to said second member, said bellows having a stiff spring member positioned internally thereof, said spring member having its longitudinal axis lying along said one axis and having its opposite ends attached to said first and second support members respectively, and means to seal and pressurize the interior of said bellows;

d. a pair of pressurized bellows-spring supported resilient attaching means similar to said resilient attaching means attached along said one axis, and disposed along each of two axes which are perpendicular to each other and to said one axis;

e. each of said pressurized bellow-spring supported resilient attaching means having one of its ends attached to said first support member and the other of its ends attached to a surface of said second support member; and

f. the material and construction of each of said bellows members of said one axis and each of said two axes being such as to permit axial compression and expansion resulting in translational motion along the longitudinal axis of said bellows but to resist torsion which would result in rotation about said longitudinal axis of said bellows.

3,904,164

SUCTION MEANS FOR ATTACHING ARTICLES TO ROAD VEHICLES

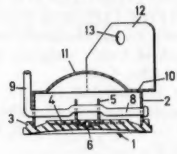
Frederick Charles Wheeler, 8 Stambrook Pk., Bath, and Barry Edward Vosper Staples, 2 and 3, Great Pulteney St., London, both of England

Filed Mar. 7, 1974, Ser. No. 449,087

Claims priority, application United Kingdom, Mar. 7, 1973, 11079/73

Int. Cl.[2] F16M *13/00*

U.S. Cl. 248—362 **6 Claims**



1. Suction means for supporting an article comprising a suction pad of resilient and flexible material, a hollow support member to one end of which the pad is attached, a platform attached to the other and opposite end of the support member, a metallic member projecting from the side of the pad adjacent the platform, aperture means through the metallic member within which is positioned a cranked portion of a cranked rod, two diametrically opposed holes in the support member which act as bearings for the cranked rod and a lever handle at one end of the cranked rod for rotating the rod to move the metallic member towards the platform to cause the pad to adopt a saucer shape and thus provide a sub-atmospheric pressure therein when the pad is placed in contact with a smooth impervious surface, wherein said platform is provided with two upstanding walls and a dome means for supporting a load, said walls being at right angles to said platform and at an angle to each other, said dome means being coaxial with said paid so that a load placed on said suction means will be retained by said walls and supported by said dome means so as to distribute the load on said pad symmetrically.

3,904,165

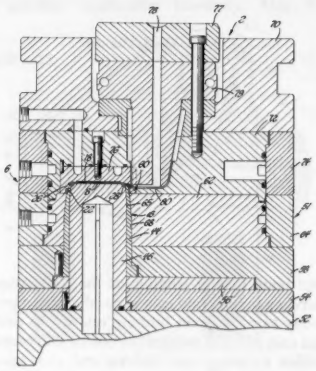
MOLDING APPARATUS FOR SAFETY CAPS

Cornelis Gerardus Den Boer, Windsor, Canada, assignor to International Tools, Windsor, Canada

Filed Apr. 29, 1974, Ser. No. 465,210

Int. Cl.[2] B29C *1/00, 7/00;* **B29F** *1/14*

U.S. Cl. 249—67 **11 Claims**



1. Molding apparatus for molding a one-piece plastic cap comprising: a first mold portion having a cavity formed therein, said cavity having an end surface for defining the outer surface of a base of the cap, and a side surface extending from the periphery of said end surface for defining the outer surface of a peripheral flange of the cap; a second mold portion projecting into said cavity, said second mold portion having an upper surface spaced from and cooperating with said end surface to define the inner surface of the base of the cap, an outer surface spaced from and cooperating with said side surface to define the inner surface of the peripheral flange of the cap, and a plurality of notches recessed in said outer surface for defining inwardly projecting locking lugs on the peripheral flange of the cap, said notches each having an open end at said upper surface and an inner surface spaced from said outer surface of said second mold portion; and a plurality of lug forming elements, equal in number to said notches, projecting radially inwardly from the side surface of said cavity and depending from the end surface thereof, said lug forming elements each projecting past said outer surface of said second mold portion into one of said notches and having a lower end projecting from said side surface past said outer surface to the inner surface of said notch, said lower end being spaced from the lower end of the respective notch for defining the upper surface of one of said lugs, said lug forming elements each filling that portion of the respective notch between the open end thereof and the lower end of said lug forming element, said lug forming elements each having an upper end joined integrally to said end surface of said cavity and being joined integrally along its length with said side surface of said cavity.

3,904,166

HOT TOP LINER UNIT WITH FLEXIBLE PLASTIC ENVELOPE

Melvin Eugene Wadsworth, Chardon, Ohio, assignor to Combustion Engineering, Inc., Windsor, Conn.

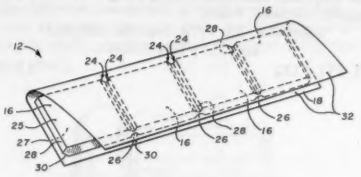
Filed July 14, 1972, Ser. No. 271,848

Int. Cl. B22d *7/10*

U.S. Cl. 249—197 **7 Claims**

1. An insertable liner unit for use in hot topping, said unit comprising a plurality of end adjacent hot top side board members and a jacket of flexible heat sealable plastic completely enveloping and retaining therewithin said side board

members in substantially end adjacent relationship, said side board members being angularly movable relative to one another from a flat end-to-end position to an end adjacent angled geometry for installation in a liner in a hot top.

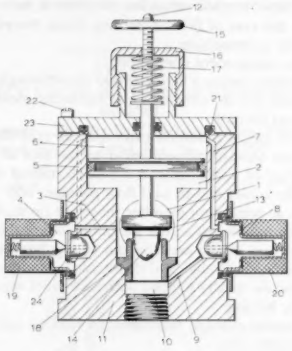


3,904,167

ELECTRIC WATER FAUCET

Joseph Touch, and Dianne Ellen Touch, both of Rt. 2, Box 260, San Antonio, Tex. 78228

Filed July 2, 1973, Ser. No. 375,510
Int. Cl.[2] F16K *31/02, 31/363*
U.S. Cl. 251—14 **7 Claims**



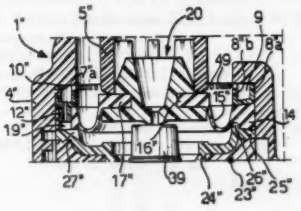
1. An electric solenoid controlled faucet comprising:
a. a faucet housing substantially encasing a cylindrical chamber,
b. a piston secured to a shaft movably mounted in the cylindrical chamber in said housing,
c. said piston dividing said cylindrical chamber into an upper secondary chamber and a lower primary chamber,
d. a closing solenoid operably mounted on said housing,
e. a closing solenoid passage leading from said lower primary chamber to,
f. a chamber of said closing solenoid,
g. a secondary chamber passage extending through the faucet housing interconnecting said chamber of said closing solenoid and said secondary chamber,
h. said secondary chamber passage receiving fluid pressure from said primary chamber through said chamber of said closing solenoid to said secondary chamber when said closing solenoid is open applying pressure to said piston closing said faucet,
i. an opening solenoid operably mounted on said housing,
j. a passage projecting through said faucet housing interconnecting said secondary chamber and,
k. the chamber of said opening solenoid,
l. a spill passage interconnecting said chamber of said opening solenoid and,
m. the outlet branch line from said valve housing,
n. said spill passage and said passage from said secondary chamber to said opening solenoid including means adapted to release fluid from said secondary chamber through said chamber of said opening solenoid when said means is open permitting said faucet to open.

3,904,168

ELECTRO-MAGNETICAL FLUID FLOW CONTROL VALVE WITH DIFFERENTIAL ACTION

Antonio Marocco, Arma Di Taggia, Italy, assignor to Elge Establishment, Mauren, Liechtenstein

Filed Apr. 23, 1974, Ser. No. 463,235
Claims priority, application Italy, Apr. 27, 1973, 68185/73
Int. Cl.[2] F16K *31/40, 31/385*
U.S. Cl. 251—30 **6 Claims**



1. In a electromagnetically operated differential action fluid flow control valve of the type comprising:
a valve body,
an inlet to the valve body,
an outlet from the valve body,
an outer annular chamber communicating with said inlet,
an inner chamber coaxial with said outer annular chamber and communicating with said outlet,
a disc-like valve shutter located coaxially at one end of said inner and outer chambers, said valve shutter being movable axially of said chambers between a first position where it interrupts communication between said inner and outer chambers and a second position where it permits communication between said inner and outer chambers,
a diaphragm of resilient material, said diaphragm comprising:
an outer annular part,
an intermediate annular part the thickness of which is less than that of said outer annular part, said intermediate annular part being resiliently deformable, and
a central part of the thickness of which is greater than that of said intermediate annular part,
means tightly securing said outer annular part at its periphery to said valve body,
a fixed lower insert element housed in said valve body and defining a cavity in said valve body with which said diaphragm cooperates to define a pilot chamber separated by said diaphragm from said inner and outer coaxial chambers,
means defining a communication passageway between said pilot chamber and said outer annular chamber,
means defining a discharge opening between said pilot chamber and said outlet of said valve body, and
an axially movable electromagnet core the position of which is controlled by an electromagnet to close or open said discharge opening of said pilot chamber,
the improvement wherejn said communication passageway between said annular outer chamber and said pilot chamber is formed by an axial conduit loacted radially outwardly of said annular flexible intermediate part of said diaphragm, there being means defining a radial opening in said fixed lower insert element which forms one wall of said pilot chamber, said radial opening communicating with one end of said communication conduit,
means defining an intermediate chamber communicating with the other end of said communication conduit,

a wall having a plurality of filtering orifices therein separating said intermediate chamber from said annular outer chamber and

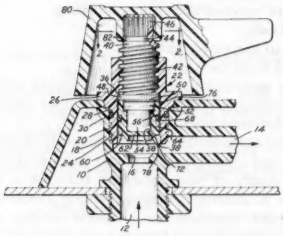
an annular upper insert element having a tubular axial projection extending therefrom, said axial projection forming at least part of said axial communication conduit between said annular outer chamber and said pilot chamber, said annular upper insert element forming part of the wall of said annular outer chamber and engaging said outer annular part of said diaphragm,

a plurality of openings in one wall of said annular upper insert element forming said filtering orifices permitting communication between said annular outer chamber and said intermediate chamber.

3,904,169
VALVE CONSTRUCTION

Lawrence P. Cohn, Clarkston; Larry G. Turner, Waterford, and Dennis W. Crawford, Pontiac, all of Mich., assignors to Bristol Products, Inc., Bristol, Ind.

Filed Oct. 19, 1973, Ser. No. 407,936
Int. Cl.[2] F16K *27/00*
U.S. Cl. 251—86 **6 Claims**



1. A valve assembly comprising

a valve stem

a bonnet encircling said stem and having screw threaded connection with said stem,

said bonnet having an inner cylindrical bore,

said stem having a reduced diameter inner end portion defining a shoulder,

a cup-shaped closure member encircling said reduced stem end portion with slight clearance accommodating relative rotation of said stem and said closure member and limited rocking of said closure member on said stem,

said stem having a circumferential groove adjacent said shoulder and said closure member having a circumferential internal lip at its open end seating rotatably in said groove in a snap fit, said shoulder groove and closure lip constituting circumferential interlocking components,

said closure member having an end sealing surface adapted for sealing face contacting engagement with the valve seat of a valve body,

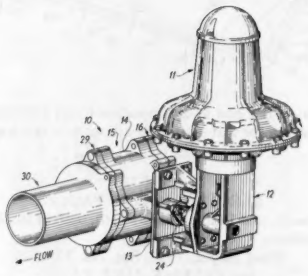
a resilient seal encircling said closure member intermediate its length and frictionally engaging the cylindrical bore of said bonnet, said bonnet having an interfitting screw threaded connection with the valve body, and

a resilient seal encircling said bonnet and engaging the valve body adjacently above said screw threaded connection, said bonnet including a shoulder spaced above parts of said valve body, a cover plate having marginal edges located between said bonnet shoulder and a said valve body part and being urged by said shoulder into a clamped engagement with said valve body.

3,904,170
FLOW CONTROL VALVE

John R. Curran, Attleboro, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed Dec. 23, 1974, Ser. No. 535,622
Int. Cl.[2] F16K *51/00*
U.S. Cl. 251—152 **12 Claims**



1. A flow control valve for installation in a flow line to regulate the rate of flow of process fluids therethrough comprising, in combination:

a valve component comprising;

a nozzle having a flow passage therethrough with an inlet end and an outlet end and mounting means at the inlet end thereof,

pivot means mounted externally on said nozzle with the axis thereof perpendicular to the axis of the flow passage of said nozzle at a predetermined distance from the outlet end of said flow passage, and

a flow regulating member mounted on said pivot means for movement across the outlet end of the flow passage of said nozzle and adapted to regulate the rate of flow of fluid through said flow passage and having coupling means axially aligned with said pivot means;

a body having;

a central passage therethrough with an inlet end and an outlet end,

mounting means at the inlet end of said central passage, and

a journal means,

a shaft having coupling means at one end thereof;

said valve component being adapted to be inserted in the central passage of said body with the mounting means of said valve component abutting the mounting means of said body,

means for removably attaching the mounting means of said valve component to the mounting means of said body,

the journal means of said body being adapted to receive said shafts and located so that when said shaft is inserted therein the coupling means of said shaft is aligned with and coupled to the coupling means of the flow regulating member of said valve component whereby said flow regulating means moves with movement of shaft.

3,904,171
MULTI-FUNCTION CAM OPERATOR FOR VALVE

Clyde H. Chronister; Cecil C. Grieger; Alton D. Oliver, all of Houston, and Roy W. Benefield, Magnolia, all of Tex., assignors to Chronister Development, Inc., Houston, Tex.

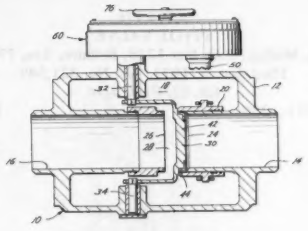
Filed Sept. 26, 1974, Ser. No. 509,625
Int. Cl.[2] F16K *31/524*
U.S. Cl. 251—159 **2 Claims**

1. A valve actuator for operating a valve having an inlet and an outlet longitudinally spaced forming an opening therebetween, a sleeve telescoping with the inlet and the outlet, a flow control device pivotally supported for rotation into and out of said opening, an actuating shaft connected to each of the

sleeve and the flow control device and extending outside of said valve comprising,

a cam follower connected to each actuating shaft,

an arm extending between each cam follower and its connected shaft positioning said followers off of the axis of said shafts,



cam means having a cam groove enclosing each of the cam followers, said cam means being pivotally mounted on a rotating shaft for rotation at a point between said actuating shafts,

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3,904,172

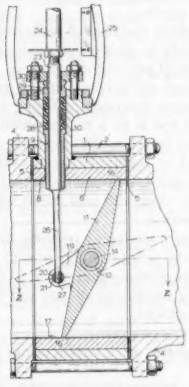
BUTTERFLY VALVE WITH QUICK CHANGE TRIM INSERT

Hans D. Baumann, 29 Villa Dr., Foxboro, Mass. 02035

Filed July 24, 1974, Ser. No. 491,297

Int. Cl.[2] F16K *51/00, 1/22*

U.S. Cl. 251—305 **6 Claims**



1. Butterfly valve with quick change trim insert comprising:

a. a tubular housing having plane, terminating surfaces at opposite ends, defining one inlet and one outlet end respectively; said inlet and outlet ends adapted to be coupled to a pipe line;

b. a longitudinal, straight, cylindrical passage formed in said housing and extending between said inlet and outlet ends;

c. a tubular insert assembly removably placed within the straight, cylindrical passage, terminating essentially flush with said inlet and outlet ends of said housing;

d. a bore breaching both walls and extending perpendicularly through the longitudinal axis and along the horizontal axis of said tubular insert;

e. a shaft located within said bore and connecting both walls of said tubular insert;

f. suitable bearing means located on said shaft to carry said shaft with respect to said housing;

g. a valve disc tiltingly engaged on said shaft and within the central circular opening of said tubular insert;

h. a valve stem extending through an opening of both, housing and tubular insert, and means for tiltingly engaging said valve disc following any reciprocating motion of said valve stem;

i. suitable sealing means for said valve stem sealing said opening and means located externally of said valve housing to properly connect said valve stem to conventional actuating devices.

3,904,173

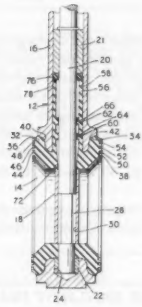
BUTTERFLY VALVE ASSEMBLY

Alexander L. Naylor, Binghamton, N.J., assignor to The Fairbanks Company, Binghamton, N.Y.

Filed Dec. 10, 1973, Ser. No. 423,097

Int. Cl. F16k *1/22, 41/00;* **F16l** *58/00*

U.S. Cl. 251—306 **6 Claims**



1. A butterfly valve assembly comprising a valve body having a central cavity bordered by opposed outer faces and a hollow neck portion communicating with said central cavity, a valve stem pivotally mounted within said hollow neck portion, a disc disposed within said central cavity for the purpose of modifying and reversibly closing off flow through the butterfly valve assembly, attachment means for attaching said disc to said valve stem, an elastomeric liner molded and bonded on the outer faces of said valve body adjacent to said central cavity and providing a seal between said disc and said valve body, said elastomeric liner being formed with an integral cylindrical extension extending into said hollow neck portion and encircling said valve stem, said extension being molded onto and bonded to the inner surface of said hollow neck portion and being formed with at least one integral circumferential annular bead extending inwardly into said hollow neck portion, with said bead projecting toward said valve stem and pressing firmly against the outer surface of said valve stem for the purpose of providing a seal between said elastomeric liner extension and said valve stem.

3,904,174

WEB TIP SEAT CUP

Elroy J. Giese, deceased, late of Cleveland, Ohio (by Alice Giese, executrix), assignor to Tomlinson Industries, Inc., Cleveland, Ohio

Filed Oct. 25, 1972, Ser. No. 300,450

Int. Cl. F16k *23/00, 7/00*

U.S. Cl. 251—331 **5 Claims**

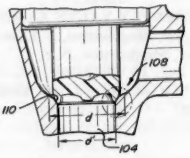
1. A valve comprising:

a valve body having a cylindrical valve chamber connected with a lateral inlet passage and an axial outlet passage;

a valve seat formed in said chamber about said outlet passage;

a stem member extending generally axially into said valve chamber;

a resilient generally cup-shaped valve member positioned in said valve chamber and having an end face adapted to engage in said valve chamber and having an end face adapted to engage said seat and a peripheral side wall sealingly engaged with the inner wall of said chamber at a location axially spaced from said inlet, the end of said valve member including a sealing portion in the form of a resilient peripheral downwardly extending flange of



tapered cross-section terminating in a relatively narrow circumferentially continuous band, said sealing portion adapted to engage said seat about said outlet, said flange being defined by inner and outer walls with the outer wall being cylindrical and having its longitudinal axis substantially parallel to the axis of said valve chamber and said inner wall being inclined at an angle in the range of approximately 20° to 60° relative to the axis of said chamber; and,

wherein said seat comprises a convex surface which engages said sealing portion circumferentially about said flange.

3,904,175

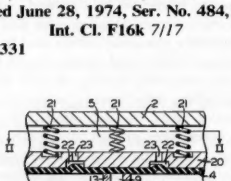
ARRANGEMENT OF RESILIENT DIAPHRAGM ACTING AS A VALVE SEAT AND SEPARATING ADJACENT PRESSURE CHAMBERS

Roger Deschenes, Montfermeil, France, assignor to WABCO Westinghouse, Freinville-Sevran, France

Filed June 28, 1974, Ser. No. 484,155

Int. Cl. F16k *7/17*

U.S. Cl. 251—331 **7 Claims**



1. In a valve device comprising a first casing section having a first pressure chamber and secured to a second casing section having a second pressue chamber therein, said second pressure chamber being normally charged at a pressure higher than said first pressure chamber, the combination of:

a. a diaphragm member sealingly secured at its outer periphery between said first and second casing sections for separating said first pressure chamber from said second pressure chamber;

b. a valve member operably disposed in said second chamber and having a valve seat thereon, said valve member normally being biased toward a seated position in which said valve seat is seated on one side of said diaphragm member adjacent said second chamber; and

c. a follower plate biased against the opposite side of said diaphragm member for movement therewith and having a recess formed therein on the side adjacent said opposite side of the diaphragm, the portion of said diaphragm extending over said recess being distortedly forced thereinto by the higher pressure in said second chamber for causing the remainder of the diaphragm to be drawn taut and flat for insuring sealing contact of said valve seat thereon.

3,904,176

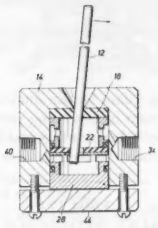
PIVOT VALVE

Robert H. Welker, P.O. Box 1228, Bellaire, Tex. 77401

Filed Jan. 5, 1973, Ser. No. 321,349

Int. Cl. F16k *1/16*

U.S. Cl. 251—339 **13 Claims**



1. A control valve comprising:

a valve body having an internal cavity of specified size therein;

inlet and outlet passages through said body in communication with said cavity;

a diaphragm of sheet material of sufficient width to extend across said cavity to divide said cavity into two portions between said inlet and outlet passages;

a rod extending into said cavity and into an opening formed in said diaphragm, said opening fitting snuggly about said rod when said rod is in a first position to prevent fluid communication between the portions of said cavity and being distorted on manipulation of said rod to a second position whereupon the opening in said diaphragm communicated said inlet with said outlet when said rod is in the second position;

a second diaphragm having an opening therein and closing said cavity at the point of entry of said rod; and,

means pivotally supporting said rod at a pivot positioned to permit pivoting movement of said rod between said first and second positions.

3. A control valve comprising:

a valve body having an internal cavity of specified size therin;

inlet and outlet passages through said body in communication with said cavity;

a diaphragm of sheet material of sufficient width to extend across said cavity to divide said cavity into two portions and positioned between said inlet and outlet passages;

a rod extending into said cavity from the exterior of said body and into an opening formed in said diaphragm, said opening fitting snuggly about said rod when said rod is in a first position to prevent fluid communication between the portions of said cavity and being distorted on manipulation of said rod to a second position whereupon the opening in said diaphragm communicates said inlet with said outlet when said rod is in the second position;

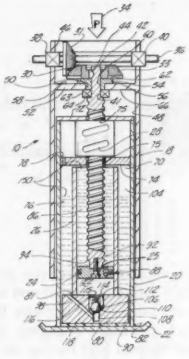
seal means sealingly engaging said rod at a point along its length to close said cavity to leakage along said rod;

and wherein said diaphragm is formed of resilient material and including a rigid backing member on one side thereof to position said diaphragm.

3,904,177
HYDROMECHANICAL JACK

Thomas B. Dalton, Muskegon, Mich., assignor to Westran Corporation, Muskegon, Mich.

Filed Aug. 12, 1974, Ser. No. 496,733
Int. Cl. B66f *3/16*
U.S. Cl. 254—103 **1 Claim**



1. An improved descent rate limiting device for use in combination with a hydromechanical jack of the type having an outer housing including axial load carrying and rotary mechanical force input means, an inner housing with a reservoir formed therein for hydraulic fluid, and a piston operably disposed in a hydraulic cylinder, said piston axially abutting a threaded shaft which is operatively connected to said inner and said outer housings wherein, the improvement comprises: a first passage disposed in the lower and of said hydraulic cylinder connecting the interior of said cylinder to said reservoir,

a second passage extending through said piston;

a first ball type one way check valve disposed in said first passage to permit the flow of said hydraulic fluid from said reservoir into said hydraulic cylinder only as said jack is raised;

a second ball type one way check valve disposed in said second passage to permit the flow of hydraulic fluid through said piston only as said jack is lowered; and

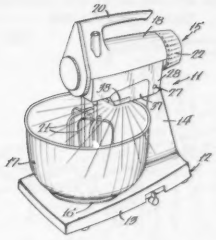
the cross sectional area of said first passage being larger than the cross sectional area of said second passage whereby said jack is permitted to be raised at a greater rate than the rate of descent of said jack.

3,904,178
HOUSEHOLD FOOD MIXER

William H. Scott, Lombard, and Eugene B. Szymczak, Glen Ellyn, both of Ill., assignors to Sunbeam Corporation, Chicago, Ill.

Filed Dec. 23, 1974, Ser. No. 535,207
Int. Cl.² B01F *9/12*
U.S. Cl. 259—1 R **10 Claims**

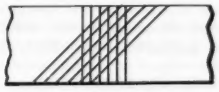
1. A household electric food mixer comprising an elongated housing, a motor enclosed in said housing, food beaters connected to said motor and supported at one end of said housing extending laterally therefrom, a handle connected to said housing and extending parallel thereto, an electric light including a bulb and socket connected in circuit with said motor and mounted on the exterior of said housing adjacent to said food beaters, mounting means for said socket including a frame having a base portion to which said socket is secured, said frame including a lense support which extends around said bulb and receives a lense, said frame and said lense cooperating with the sidewall of said housing to form an enclosure for said bulb and socket.



3,904,179
METHOD AND APPARATUS FOR EXTRUDING MELTED PLASTIC MIXTURES

Desider G. Csongor, 35 Wilson Rd., Bedford, Mass. 01730

Division of Ser. No. 273,190, July 19, 1972, Pat. No. 3,836,127. This application Nov. 16, 1973, Ser. No. 416,501
Int. Cl.² B29B *1/06;* **B01F** *7/08*
U.S. Cl. 259—191 **4 Claims**



1. In a method of extruding a mixture of plastic particles and additives in which the plastic particles and additives are introduced into an extruder screw and barrel apparatus, the steps which include subjecting the mixture to heat and pressure to provide a melted mixture in the extruder apparatus, travelling the mixture in a helically-directed stream, continuously subjecting the helical stream at one point to shearing stress which cuts the helical stream across its cross section to provide displaced layers of material, conducting the displaced layers in a turbulent flow path along passageways of short axial length and then moving the melted mixture from the passageways of short axial length in a helically-directed stream out of the said extruder apparatus.

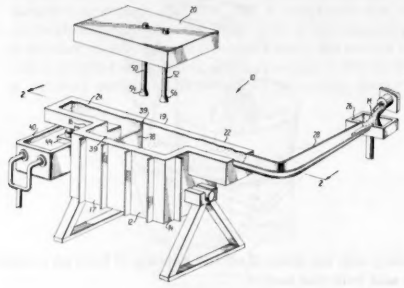
3,904,180
APPARATUS FOR FLUXING AND FILTERING OF MOLTEN METAL

Joseph A. Bass, Bremen; Lewis A. McKenzie, and Frank M. Powers, both of Carrollton, all of Ga., assignors to Southwire Company, Carrollton, Ga.

Filed May 18, 1973, Ser. No. 361,589
Int. Cl.² C22B *21/06*
U.S. Cl. 266—34 PP **19 Claims**

1. A two-stage tandem apparatus for continuously treating molten metal to substantially remove gas and finely-divided solids therefrom, comprising a treating chamber including an inlet and an outlet for the molten metal and having side walls and a floor, a refractory weir dividing said chamber into first and second sections, said weir extending vertically and being spaced from said floor for providing communication between said first and second sections, a removable lid completely covering said first and second sections, means for introducing a fluxing gas into said first section for fluxing hydrogen gas from molten metal contained therein, a filtering medium disposed only in said second section for filtering finely-divided solids from molten metal passed upwardly therethrough, and means for providing a protective atmosphere above the sur-

face of the molten metal in said first and second sections to prevent the reabsorption of hydrogen gas into the metal after



it has been fluxed therefrom, said means for providing including sealing means associated with said removable lid.

3,904,181

FLUID TYPE ACCUMULATOR SPRING WITH EMERGENCY BACK-UP SPRING

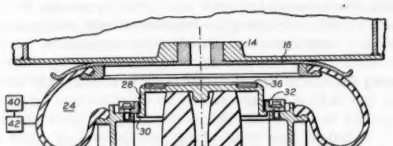
Gábor Hársy-Vadas, Neuhausen, Switzerland, assignor to SIG Schweizerische Industrie-Gesellschaft, Neuhausen, Switzerland

Filed Apr. 29, 1974, Ser. No. 465,218

Claims priority, application Switzerland, Feb. 28, 1974, 2822/74

Int. Cl.² B60G *11/62*

U.S. Cl. 267—35 **24 Claims**



1. A spring system comprising a combination of a main spring and an associated back-up spring:

said main spring having first and second spaced apart sections, which said sections are movable toward one another; said main spring including elastically operating means for biasing said first and second sections apart;

said back-up spring having a stressing surface; said back-up spring being normally prestressed; means for normally prestressing said back-up spring;

said back-up spring stressing surface being normally spaced a first distance from said main spring first section; said back-up spring stressing surface and said main spring first section being shiftable toward one another upon application of forces to either of them and said main spring first section and said back-up spring stressing surface being so positioned that after movement of said main spring first section over said first distance relative to said stressing surface, said main spring first section engages said stressing surface, and further movement of said first main spring section in the same direction further stresses the prestressed said back-up spring.

3,904,182

HYDRAULIC SHOCK ABSORBER AND PNEUMATIC SPRING DEVICE

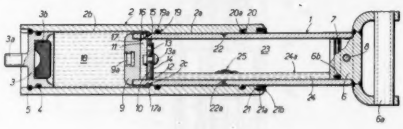
Fernand Michel Allinquant, 53, Avenue Le Notre, and Jacques Gabriel Allinquant, 12, Avenue Ardoet, both of 92-Sceaux, France

Filed Oct. 12, 1973, Ser. No. 405,889

Claims priority, application France, Oct. 30, 1972, 72.38457

Int. Cl. F16f *9/06*

U.S. Cl. 267—64 R **8 Claims**



1. In a fender shock absorber of the type provided with an outer tube having a liquidtight closure at one end thereof and supported to extend horizontally, a likewise horizontally extending inner tube telescopically engaging said outer tube through the other end thereof and having an inner terminal section located inside said outer tube opposite said closure to define therewith and with the wall of said outer tube a variable-volume plenum filled with hydraulic liquid, and an outer terminal section projecting outside said outer tube and sealed to define with said inner terminal section and the wall of said inner tube a constant-volume pneumatic spring chamber containing an underlying amount of hydraulic liquid at a lowermost region thereof and an overtopping amount of gas under pressure above the liquid level therein, locking means associated with said sealed outer terminal section for securing said inner tube against angular displacement about the axis thereof thereby angularly locating said lowermost region of said pneumatic spring chamber, the improvement comprising a liquid flow control mechanism fitted at said inner terminal section of said horizontally extending inner tube, said control mechanism comprising the combination of:

a plug secured to the extremity of said inner terminal section,

a transverse partition secured to said inner terminal section in axially spaced relationship with said plug towards the outer terminal section of said inner tube to define with said plug a chamber intermediate said variable-volume plenum and said constant-volume pneumatic spring chamber,

a first constricted passageway connecting said plenum with said intermediate chamber and permanently allowing liquid flow in both directions while offering resistance thereto,

a second constricted passageway connecting said intermediate chamber with said lowermost region below said liquid level in said pneumatic spring chamber and permanently allowing liquid flow in both directions while offering resistance thereto,

a third passageway formed through said partition to connect said intermediate chamber with said pneumatic spring chamber in spaced parallel flow relationship with said second constricted passageway, said third passageway having a passage area substantially larger than that of said second constricted passageway, and

a check valve associated with said third passageway to permit flow therethrough from said intermediate chamber towards said pneumatic spring chamber upon plunging movement of said inner tube into said outer tube, while hindering flow in the opposite direction upon extension movement of said inner tube out of said outer tube.

3,904,183

SUSPENSION STRUT

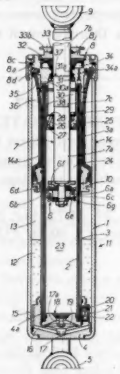
Fernand Michel Allinquant, 53 Avenue Le Notre, and Jacques Gabriel Allinquant, 12 Avenue Arouet, both of 92-Sceaux, France

Filed Feb. 5, 1974, Ser. No. 439,753

Claims priority, application France, July 26, 1973, 73.27410; Jan. 9, 1974, 74.00688

Int. Cl.[2] F16F 5/00

U.S. Cl. 267—64 R 11 Claims



1. In a suspension strut for fitting between unsprung and sprung parts of a vehicle, an automatic level-control device comprising:

first and second chambers each containing hydraulic fluid and a pneumatic spring;

a pair of pumping elements connected respectively to the unsprung and sprung parts and comprising a pumping chamber communicating with the first chamber through an intake valve assembly and with the second chamber through a delivery valve assembly, and a plunger reciprocable in the pumping chamber to pump hydraulic fluid from the first chamber to the second chamber through said intake and delivery valve assemblies, the plunger having a cylindrical portion of larger diameter, a cylindrical portion of small diameter, and a tapered portion therebetween;

a pair of annular compartments arranged end-to-end around the plunger and communicating respectively with the first chamber and with the second chamber, the said pair of compartments comprising a first annular compartment adjacent the pumping chamber and a second annular compartment adjacent the first annular compartment; and

a pair of annular seals, comprising a first annular seal located between the pumping chamber and the first compartment, and a second annular seal located between the first compartment and the second compartment, each said annular seal having a diameter engaging tightly the larger diameter portion of the plunger, to seal said larger diameter portion, and to engage the tapered portion loosely to produce an escape of hydraulic fluid therebetween.

3,904,184

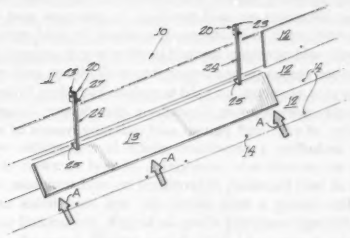
TOOL FOR HANGING SIDING OR THE LIKE

Harold A. Krueger, c/o Krueger Engineering, 97 W. Walnut, Morocco, Ind. 47963

Filed Mar. 20, 1974, Ser. No. 452,758

Int. Cl.[2] B23Q 3/02

U.S. Cl. 269—102 3 Claims



1. A tool for positioning a siding board or like workpiece against a wall, comprising a mounting head, an arm pivotally depending from the head, biasing means functionally interposed between said mounting head and said arm to resiliently urge the arm toward the wall, a spike extending through the head and the arm and adapted to secure the head to the wall, spike retaining means for retaining said spike in its position extending through said head and arm, the retaining means including means permitting limited translational motion of the spike relative to the head and arm between predetermined limits, and permitting pivotal motion of the spike relative to the head and arm between predetermined limits, resilient means for urging the spike toward a rest position of predefined translational and pivotal location relative to said head and arm, and workpiece retaining means on the arm for retaining the workpiece against the wall.

3,904,185

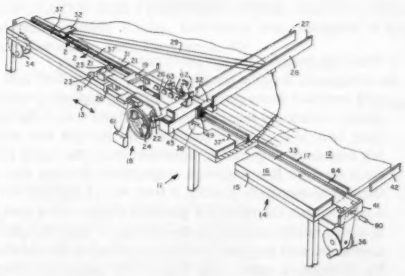
APPARATUS FOR SIMULTANEOUSLY FABRICATING A PLURALITY OF WALL FRAME PLATES

Fredric H. Schneider, 4521 Merrill Ave., Oakland, Calif. 94619

Filed June 1, 1973, Ser. No. 366,081

Int. Cl.[2] B23Q 3/00

U.S. Cl. 269—291 7 Claims



1. Frame wall fabrication apparatus comprising: means defining a generally planar fabrication area having a length dimension substantially equal at least to the length dimension of a plurality of wall frames desired for frame walls; a carriage track extending lengthwise of said fabrication area; a lumber end positioning carriage on said track for adjustable positioning along said track lengthwise of said fabrication area, said carriage including a lumber stop projecting over said fabrication area for engagement with the ends of lumber to position the same for the formation of wall plates thereform; a tem-

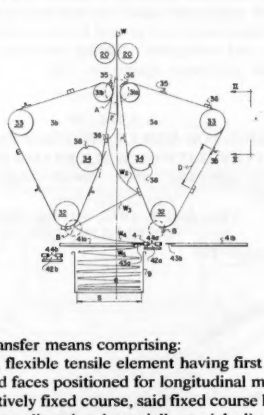
plate extendable lengthwise of said fabrication area adjacent said track, said template having a plurality of succeeding sections representative of differing lengths desired for wall plates; and means for separately positioning each of said template sections at a predetermined location lengthwise along said fabrication area, each of said template sections including a mechanical locator element therealong representative of a desired length for a plurality of wall plates, said carriage including indexing means mechanically engageable with said locator elements on said template to position said carriage along said track at locations determined by said template for properly said positions for said lumber stop to engage the ends of lumber pieces to be formed into wall plates, said mechanical locator elements on said template including holes in said template spaced apart therealong the desired length for a plurality of said wall plates, said indexing means of said carriage including a projection which is engageable with said holes to provide said positioning of said carriage along said track at said locations determined by said template, and said template being a thin metal slat and said holes extending therethrough centrally along its length, the central portion of said slat having said holes being bowed outwardly in transverse crosssection to thereby raise said central portion from its side edges.

3,904,186

ACCORDION, FOLDING AND CUTTING APPARATUS

John De Ligt, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Division of Ser. No. 176,487, Aug. 31, 1971, Pat. No. 3,784,188. This application July 12, 1973, Ser. No. 378,600
Int. Cl.[2] B65H *45/00*
U.S. Cl. 270—61 F **4 Claims**



1. Material transfer means comprising:

An elongated, flexible tensile element having first and second opposed faces positioned for longitudinal movement along a relatively fixed course, said fixed course having at least two, non-aligned, substantially straight line adjoining segments disposed in approximately the same plane, each straight line segment respectively having one end thereof tangentially joining a first wheel element having a rim portion disposed for rotation about a first axis that is substantially normal to the plane of said straight line segments, said straight line segments being terminated at the respective other ends thereof by tangency with second and third rotatable wheel elements having respective rim portions, the first face of said flexible tensile element being biased by tensile stress therewithin against said rim portions of said wheel elements toward respective axes of rotation;

A cooperative pair of gripping jaw mounting members adjoining each other, secured to and longitudinally spaced along said tensile element, each mounting member having a rigid projection extending from said tensile element second face in a direction opposite from said axes of rotation, gripping jaw means for cooperatively gripping an article therebetween comprising a jaw element secured to respective projections, each of said mounting members being rotatively secured to said tensile element about a pair of articulation axes rigidly positioned relative to said projection, said articulation axes passing through said tensile element substantially perpendicular to the plane of said straight line segments; and

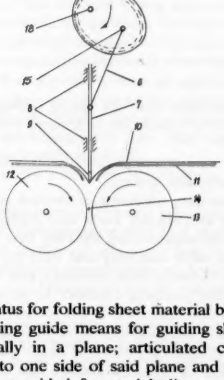
Profile means in the rim of said first wheel element being rotatively registered to engage at least one of said articulation axes respective to a cooperative pair of mounting members with a surface discontinuity for simultaneously supporting all of said articulation axes associated with a cooperating pair of mounting members in a common plane that is substantially perpendicular to the plane of said straight line segments as said articulation axes travel with said tensile element about said first axis from one straight line segment to the other whereby said gripping jaw means are prevented from relatively separating to release an article therebetween while in traverse about said first axis.

3,904,187

FOLDING OF SHEET-MATERIAL BLANKS

Klaus Hertrich, Goehrenz, and Horst Fenske, Leipzig, both of Germany, assignors to Veb Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Oct. 27, 1972, Ser. No. 301,603
Int. Cl. B65h *45/18*
U.S. Cl. 270—83 **4 Claims**

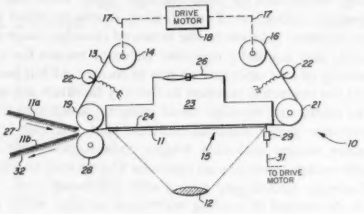


1. In an apparatus for folding sheet material blanks, a combination comprising guide means for guiding sheet material blanks substantially in a plane; articulated crank linkage means mounted to one side of said plane and comprising a deflecting element guided for straight-line movement in a direction transversely of said plane from a starting position in which it is located in its entirety at said one side of said plane to an operating position in which it extends with a portion thereof across said plane to the other side of the latter, whereby to engage and in part deflect the blank in said direction; and control means associated with said linkage means and operative for transmitting motion to said element in such a manner that the element moves from said starting position to said plane and travels at a relatively slow speed when reaching said plane and is thereupon accelerated to a higher speed while traveling from said plane toward said operating position, said control means comprising a pair of elliptically configurated turnable wheels having respective peripheries and being mounted for turning movement about parallel axes located in such a manner that the peripheries of said wheels remain in engagement during turning of said wheels about said axes.

3,904,188
PRINTING PLATE TRANSFER AND SUPPORT APPARATUS

Henry N. Fairbanks, and James T. McCutcheon, both of Rochester, N.Y., assignors to Itek Corporation, Lexington, Mass.

Continuation of Ser. No. 301,031, Oct. 26, 1972, abandoned. This application Mar. 4, 1974, Ser. No. 447,600
Int. Cl.[2] B65H 5/02, 29/24
U.S. Cl. 271—3 5 Claims



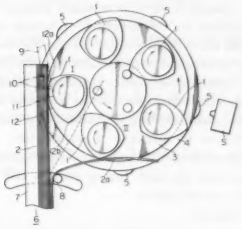
1. Platemaking apparatus comprising:
a. an imaging station including an optical imaging system having an image plane; and
b. means for transferring a printing plate to said imaging station and for supporting it in the image plane of said optical system for exposure thereat, said transferring and supporting means comprising:
1. a belt movable between a first position and a second position, said belt having first and second opposed surfaces and including a perforated area having a plurality of openings extending therethrough from said first surface to said second surface and a substantially solid area, said solid area being located in advance of said perforated area during movement of said belt from said first position to said second position, said perforated area being at least substantially as large as said printing plate;
2. means for positioning said plate adjacent said first surface of said belt;
3. a vacuum source positioned adjacent the second surface of said belt for drawing and holding said plate against said first surface thereof by suction drawn through said openings in said perforated area of said belt; and,
4. drive means for moving said belt between said first and second positions, said drive means including means for moving said belt in a forward direction from said first position to said second position for transferring said plate held thereon to said imaging station to be held in the image plane of said imaging system for exposure, and for moving said belt in a reverse direction from said second position back to said first position for withdrawing said plate held thereon from said imaging station following exposure.

3,904,189
SUCTION HEADS OF SHEET COUNTER

Yasuo Murakami, Himeji, Japan, assignor to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan

Filed July 20, 1973, Ser. No. 381,285
Claims priority, application Japan, July 31, 1972, 47-76609
Int. Cl.[2] B65H 3/08
U.S. Cl. 271—95 3 Claims

1. In a sheet counter of the type having a plurality of suction heads rotatably mounted on a rotary disk in an annular arrangement for successively separating each sheet from a sheet stack held by a sheet holding mechanism and forming a count-completed sheet group, each of said suction heads being rotated on its own axis while revolving about the axis of said rotary disk and having at least one suction port adapted to successively suck up a sheet from said sheet stack; the improvement wherein each of said suction heads is generally triangularly shaped and includes as one of its sides an arched sheet suction surface through which said suction port is formed, said arched sheet suction surface acting to provide direct contact with each foremost one of the sheets held by the sheet holding mechanism, and further includes as another of its sides a convexly arched sheet contact surface provided with a gently arched surface having a large radius and adjacent to said sheet suction surface, said convexly arched sheet contact surface being adapted to cause transfer of the portion of said sheet contact surface positioned at the most outside part from the axis of said rotary disk along a substantially rectilinear locus by cooperation of rotation of the suction head on its own axis and revolution of the suction head around the axis of the

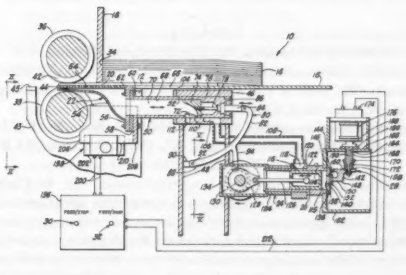


rotary disk, the action of said convexly arched sheet contact surface imparting minimum oscillatory motion to the count-completed sheet group; whereby when a sheet is sucked and separated by the suction surface of one suction head which has reached the sheet stack, the bent state of the countcompleted sheets is retained by transference of the sheet contact surface of the suction head preceding said one suction head along said rectilinear locus and, during transference of said one suction head so as to bend a sheet separated from the sheet stack by said preceding suction head, said one suction head is made to transfer while adding said separated sheet to the count-completed sheet group and causing transference of the contact surface of said one suction head along the rectilinear locus on said added sheet, thereby to secure maintenance of the bent state of the countcompleted sheet group.

3,904,190
APPARATUS FOR FEEDING PAPERBOARD BLANKS

Frederick Reinhold Kuehn, Baltimore, Md., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Mar. 15, 1974, Ser. No. 451,566
Int. Cl.[2] B65H 3/12
U.S. Cl. 271—99 7 Claims



1. An improved blank feeding machine for feeding successive bottom blanks from a stack of blanks into adjacent processing machinery comprising in combination:

support means for supporting said stack of blanks thereon and defining with a gate means an opening therebetween through which said bottom blanks are successively advanced into said adjacent machinery;

advancing means reciprocable beneath said stack for applying suction pressure to said bottom blanks from the beginning of the feed stroke of said advancing means and continuing substantially through the first half of said feed stroke and thereafter for venting said suction pressure to atmosphere until the beginning of the next successive feed stroke;

suction pump means for delivering suction pressure to said advancing means during the forward stroke of a piston means within said suction pump means, said suction pump means including valve means electrically operable upon command for preventing delivery of said suction pressure to said advancing means;

selectively operable first command means for electrically operating said valve means to prevent delivery of said suction pressure during each forward stroke of said piston means to prevent advancement of said blanks; and

selectively operable second command means for electrically operating said valve means to prevent delivery of said suction pressure during alternate forward strokes of said piston means to prevent advancement of said blanks during alternate feed strokes of said advancing means.

3. An improved suction pump means for a blank feeder comprising in combination:

a cylinder means;

a piston means reciprocable within said cylinder means for creating suction pressure within said cylinder means on the forward stroke of said piston means;

drive means connecting said piston means and said blank feeder for reciprocating said piston means in timed relation thereto;

conduit means connected between said cylinder means and a reciprocable blank advancing means on said blank feeder adapted to deliver suction pressure of predetermined magnitude from said cylinder means substantially instantaneously to said advancing means at the beginning of the feed stroke of said advancing means; and

a valve means for automatically venting said cylinder means during the return stroke of said piston means, said valve means being electrically operable in response to a first command means to continuously vent said cylinder means to atmosphere on each forward stroke of said piston means and electrically operable in response to a second command means to vent said cylinder means to atmosphere on alternate forward strokes of said piston means.

3,904,191

HOPPER LOADING METHOD AND APPARATUS

Robert E. Maier, Jr., Landisville, and Joseph P. McGinnis, Raubsville, both of Pa., assignors to Harris-Intertype Corporation, Cleveland, Ohio

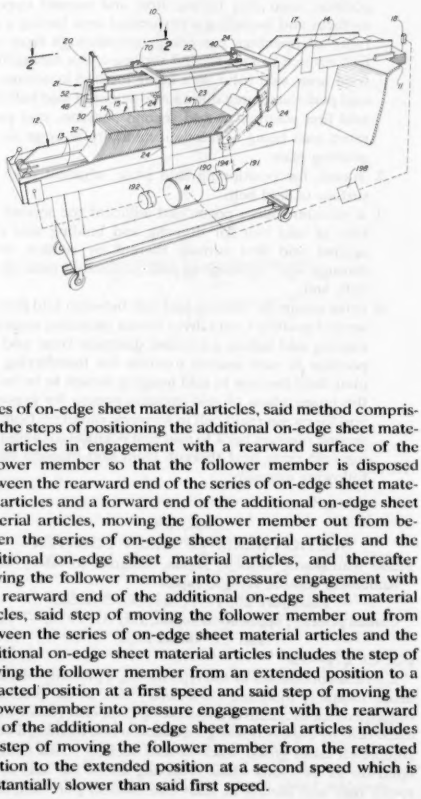
Continuation-in-part of Ser. No. 310,007, Nov. 28, 1972, abandoned. This application July 23, 1973, Ser. No. 381,881

Int. Cl.[2] **B65H** *1/02, 1/30*

U.S. Cl. 271—150 **16 Claims**

1. An apparatus for loading a hopper with sheet material articles, said apparatus comprising conveyer means for transporting the sheet material articles to the hopper, a movable carriage disposed above said conveyer means, a follower member connected with said carriage, said follower member being movable relative to said carriage between a retracted position in which said follower member is spaced from a series of on-edge sheet material articles on said conveyer means and an extended position in which said follower member engages the series of on-edge sheet material articles, biasing means for urging said carriage toward the hopper to press said follower member against trailing articles in the series of on-edge sheet material articles when said follower member is in the extended position to thereby hold the trailing article in an on-edge orientation, operator means for moving said follower member from the extended position to the retracted position to disengage said follower member from the series of on-edge sheet material articles, manually engageable handle means for effecting movement of said carriage away from the hopper against the influence of said biasing means to move said follower member relative to the series of on-edge sheet material articles, and manually operable actuator means for effecting operating of said operator means to move said follower member to the retracted position to thereby facilitate the positioning of additional on-edge sheet material articles in the series of on-edge sheet material articles, said manually operable actuator means including trigger means mouonted on said handle means to enable an operator to grip said handle means and actuate said trigger means with one hand.

11. A method of loading additional on-edge sheet material articles into a series of on-edge sheet material articles which are being transported toward a hopper and are being engaged by a follower member having a forward surface which is disposed in pressure engagement with a rearward end of the



series of on-edge sheet material articles, said method comprising the steps of positioning the additional on-edge sheet material articles in engagement with a rearward surface of the follower member so that the follower member is disposed between the rearward end of the series of on-edge sheet material articles and a forward end of the additional on-edge sheet material articles, moving the follower member out from between the series of on-edge sheet material articles and the additional on-edge sheet material articles, and thereafter moving the follower member into pressure engagement with the rearward end of the additional on-edge sheet material articles, said step of moving the follower member out from between the series of on-edge sheet material articles and the additional on-edge sheet material articles includes the step of moving the follower member from an extended position to a retracted position at a first speed and said step of moving the follower member into pressure engagement with the rearward end of the additional on-edge sheet material articles includes the step of moving the follower member from the retracted position to the extended position at a second speed which is substantially slower than said first speed.

3,904,192
APPARATUS FOR MANIPULATING SHEETS IN COPYING MACHINES

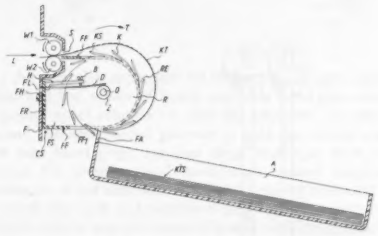
Josef Pfeifer, Unterhaching; Günter Abbe, Gilching; Rudolf Eppe, Taufkirchen; Rüdiger Ettelbrück, Munich, and Günther Schnall, Eching, all of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 21, 1974, Ser. No. 444,384

Claims priority, application Germany, Feb. 23, 1973, 2309075

Int. Cl.[2] B65H *29/40*

U.S. Cl. 271—186 **23 Claims**



1. In a copying machine, a combination comprising means for discharging information-bearing sheets of transfer material, including means for advancing successive sheets in a predetermined direction and along a predetermined path; means for collecting the thus discharged sheets; means for inverting the sheets between said discharging means and said collecting means, including at least one rotary inverting member turnable about an axis which is substantially parallel to said path and substantially normal to said direction, said rotary member being turnable by the leaders of successive sheets which are being advanced along said path; and means for braking said rotary member, including at least one braking member in frictional engagement with a portion of said rotary member and means for adjusting the friction between said braking member and said portion of said rotary member.

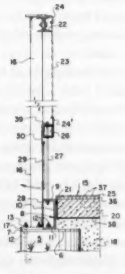
3,904,193
PLATFORM TENNIS COURT

James W. Patterson, Butler, Pa., assignor to American Platform Tennis Systems, Butler, Pa.

Filed July 2, 1974, Ser. No. 485,114

Int. Cl. A63b *61/00*

U.S. Cl. 272—3 **11 Claims**



1. A platform tennis court comprising:

A. a plurality of piers anchored in the ground in a spaced-apart, rectangular array;

B. a plurality of elongated channel members rigidly secured to and extending between said piers, said channel members defining the rectangular outer perimeter of the playing surface of the court;

C. a concrete slab construction cast within and retained by the rectangular array defined by the channel members, said slab construction including means on the edge of said slab construction abutting said channel members which enables said slab construction to be free to move relative to said channel members;

D. a plurality of upright members each secured to a pier;

E. wire screen panels forming end and sidewalls of the tennis court;

F. means for mounting said wire screen panels to said upright members; and

G. tensioning means operable between said wire screen panels and said channel members to permit vertical tensioning of the wire the wire screen panels.

3,904,194
HYDRAULIC ACTUATED ORBITAL AMUSEMENT RIDE

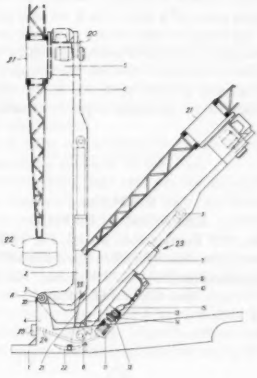
Anton Schwarzkopf, Munsterhausen, Germany, assignor to Firma Anton Schwarzkopf, Munsterhausen, Germany

Filed Mar. 27, 1974, Ser. No. 455,321

Claims priority, application Germany, Oct. 10, 1973, 2350821

Int. Cl. A63g *27/04, 1/28*

U.S. Cl. 272—49 **8 Claims**



1. An amusement apparatus comprising:

a support;

an arm pivoted at one end on said support;

a turntable at the other end of said arm rotatable thereon about an axis transverse to said arm;

a hydraulic jack having one end pivoted on said arm intermediate the ends thereof and another end pivoted on said support, whereby extension of said jack lifts said other end of said arm;

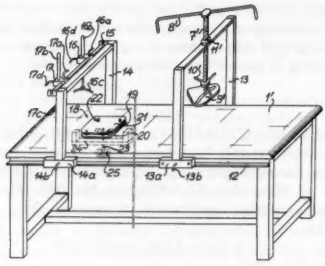
a reservoir for hydraulic fluid on said jack; and

an electromotor-driven pump on said jack having an intake side in said reservoir and in the reservoir fluid and an output side connected through a rigid conductor to said jack for pressurizing and thereby extending same, the drive for said pump comprising in line an electric motor, a torque converter and a brake connected to said pump; a solenoid-operated membrane in a fluid valve controlling actuation of said brake upon energization of the solenoid; and

electrical control circuit means for selectively actuating said motor and deactivating said solenoid and brake, and for deactivating the motor and actuating the solenoid and

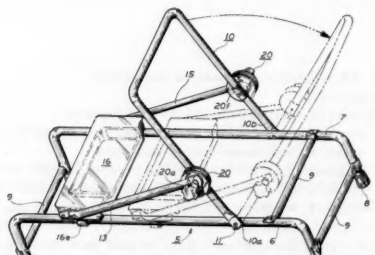
brake to respectively actuate or deactivate said jack to raise or lower said arm.

3,904,195
BODY EXERCISING AND RE-EDUCATION APPARATUS
Rene Chavanne, 10 rue Battant, Besancon, France (25000)
Filed Sept. 7, 1973, Ser. No. 395,260
Int. Cl. A63b *23/02*
U.S. Cl. 272—58 **6 Claims**



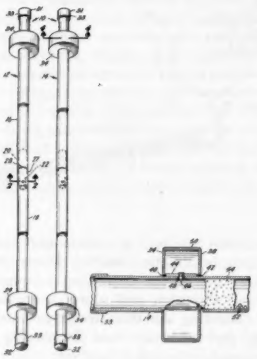
1. Body exercising apparatus, comprising; support means including plate means defining a surface for elastically supporting at least parts of a user's back on said plate means and for thereby applying to said parts a dynamic pressure; means facing said support means for applying a static pressure to the user's abdomen, directed toward the support means; and means for applying a static pressure to the user's shoulders, also in a direction towards said support means.

3,904,196
EXERCISING DEVICE
Daniel Berlin, 927 Frazier Rd., Rydal, Pa. 19046
Continuation of Ser. No. 355,091, April 27, 1973, abandoned.
This application July 18, 1974, Ser. No. 489,747
Int. Cl.[2] A63B *69/06*
U.S. Cl. 272—72 **6 Claims**



1. An exercising device comprising:
a. a generally horizontal and stationary base,
b. a generally U-shaped handle whose ends are pivotally mounted to two points on said base for movement with respect thereto,
c. a seat assembly mounted directly on said base for horizontal unbiased reciprocating movement thereon, and
d. means pivotally connected to said seat assembly and to said handle for moving said seat assembly back and forth when said handle is moved in opposite directions.

3,904,197
RHYTHMIC DANCING POLES
Sidney J. Canonge, Huntington Beach, Calif., assignor to S. I. Development Co., Huntington Beach, Calif.
Filed July 12, 1974, Ser. No. 488,015
Int. Cl.[2] A63B *5/22;* **F16B** *7/00*
U.S. Cl. 272—74 **14 Claims**

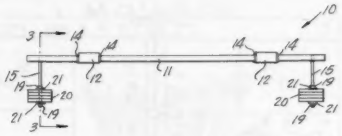


10. At least one rhythmic dancing pole for use in teaching rhythmic motor responses and coordination, said pole including:
a first tube having first and second ends and inner and outer surfaces;
a first collar including a pair of spaced flanges extending radially inwardly;
means for rotatably mounting said first collar about said outer surface of said tube a predetermined distance from the first end thereof, said means for rotatably mounting said first collar including means for engaging said tube, said means for engaging said tube having a pair of spaced abutment surfaces positioned between said pair of first collar spaced flanges for engagement therewith to restrain said first collar at said predetermined distance from said first end of said tube;
a second collar including a pair of spaced flanges extending radially inwardly; and
means for rotatably mounting said second collar about said outer surface of said tube a predetermined distance from the second end thereof, said means for rotatably mounting said second collar including second means for engaging said tube, said second means for engaging said tube having a pair of spaced abutment surfaces positioned between said pair of second collar spaced flanges for engagement therewith to restrain said second collar at said predetermined distance from said second end of said tube, said first and second means for engaging said tube a predetermined distance from said first and second ends thereof being split tubes extending about said tube more than 180°, said split tubes each having a collar attachment member extending radially inwardly, said tube having discontinuities in at least its outer surface said predetermined distance from its end portions to catch and retain said collar attachment member.

3,904,198
EXERCISE BAR

Russell P. Jones, 6059 Bradshaw Rd., Sacramento, Calif. 95826

Filed Apr. 23, 1974, Ser. No. 463,274
Int. Cl.[2] A63B 13/00, 21/22
U.S. Cl. 272—81 1 Claim

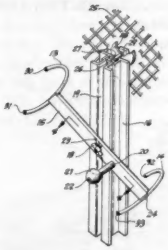


1. An exercise apparatus including an elongate generally cylindrical bar, a pair of freely rotatable hand grips mounted in spaced apart relation on said bar adjacent opposite ends thereof, circumferential grooves in said bar at each end of each said hand grips, retainer rings seated in each of said grooves for securing said hand grips against longitudinal movement along said bar, a weight support threaded shafts threaded into each end portion of said bar between the end of said bar and the adjacent hand grip and extending perpendicularly to said bar, weights on said threaded shafts and opposed nuts on each of said threaded shafts detachably securing said weights on said threaded shafts.

3,904,199
SPORTS RACKET STROKING TRAINER

Paul James Burchett, P.O. Box 386, Corona del Mar, Calif. 92625

Filed Aug. 13, 1973, Ser. No. 387,922
Int. Cl.[2] A63B 69/40
U.S. Cl. 273—29 A 7 Claims



1. A sports racket stroke training device adapted for attachment to a vertical support surface comprising:

a post, said post having attachment means for attaching said post substantially vertical on said support surface, said post also having a longitudinally extending groove therein;

a pivot shaft, said pivot shaft being received in said groove of said post, means for releasably holding said pivot shaft in said groove for selectively adjusting said pivot shaft at an infinite number of positions along said groove;

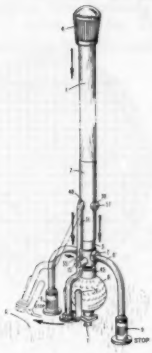
An elongated bar, said bar having means intermediate its ends for connecting said bar to said pivot shaft, said bar therefore being angularly pivotal and slidably adjustable on said post by said pivot shaft;

a pair of substantially elongated flexible guide members, said bar having a guide member attached substantially perpendicular to each of its ends, said guide members extending parallel to said pivot shaft and from a common side of said bar such that a racket must be swung past both guide members when stroked substantially along the longitudinal center line of said bar.

3,904,200
GOLF BALL AND TEE POSITIONING DEVICE

Erwin K. Jackle, 43 Union St., Sidney, N.Y. 13838, and Erwin C. Jackle, 1151 S.E. Walnut Ave., Tustin, Calif. 92680

Filed Sept. 27, 1974, Ser. No. 509,818
Int. Cl.[2] A63B 57/00
U.S. Cl. 273—33 13 Claims



1. A golf ball and tee positioning device comprising

a. a handle for setting a tee and a golf ball resting thereon, into the ground, while the player is in standing position,

b. a yieldable rest for the top portion of the golf ball at the bottom of the handle,

c. a retainer for the tee adapted to clamp the tee and golf ball in assembled position at said end,

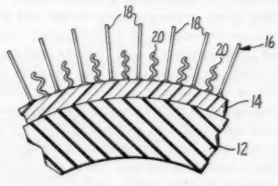
d. means for mounting said retainer for pivotal movement between a position in alignment with said yieldable rest at the bottom end of said handle and a position laterally thereof, and

e. means responsive to a longitudinal movement of said handle in the direction of its longitudinal axis following the insertion of the tee into the ground and the conclusion of the penetration thereof to a predetermined depth, for moving said retainer to its lateral position to permit the withdrawal of the handle from the tee and golf ball resting thereon.

3,904,201
TENNIS BALL

Dana R. Henry, 200 W. Mason St., No. 14, Santa Barbara, Calif. 93101

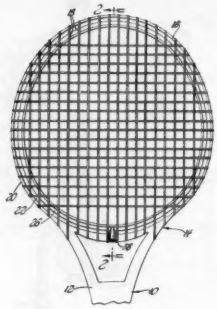
Filed Apr. 29, 1974, Ser. No. 464,989
Int. Cl.[2] A63B 39/06, 41/10
U.S. Cl. 273—61 R 1 Claim



1. A tennis ball comprising a resilient core and a coating connected to the core, said coating comprising nylon fibers

disposed normal to said core and in spaced apart relation to each other throughout their length.

3,904,202
RACKET
John Z. DeLorean, Bloomfield Hills, Mich., assignor to John A. DeLorean Corporation, Bloomfield Hills, Mich.
Filed June 14, 1974, Ser. No. 479,688
Int. Cl.[2] A63B *49/12, 51/12*
U.S. Cl. 273—73 E **5 Claims**



1. A racket of the type including a shaft, an enlarged closed frame extending from one end of said shaft, a plurality of string elements stretched about the frame to form open-weave ball engaging surfaces, said frame member including at least one substantially continuous surface extending throughout the length of the frame, and means for mechanically adjusting the tension of said string elements, said tension adjusting means including:

a. an integral, non-stretchable member of constant cross-section supported upon and extending substantially entirely about the length of said frame surface and including a pair of end portions;

b. each string element including a pair of longitudinally spaced end portions each operatively connected to said member; and

c. adjustable mechanical means mounted upon said frame and coacting with the pair of end portions of said member for moving said end portions to thereby uniformly adjust the tension of each string element.

3,904,203
SIMULATED TENNIS GAME
Takoa Matsumoto, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed June 24, 1974, Ser. No. 482,439
Int. Cl.[2] A63F *7/06*
U.S. Cl. 273—85 R **4 Claims**

1. A simulated tennis game which comprises:

a flat support structure having a top playing surface having means thereon simulating a tennis court,

upstanding posts corresponding to the net posts used with a tennis court located on said support structure so as to extend upwardly from said playing surface,

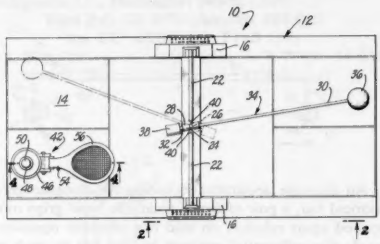
an elongated, rigid rod extending parallel to said surface and above said surface, said rod being held by said posts, a fitting having a hole extending therethrough located on said rod with said rod extending through said hole, said fitting and said hole being shaped so that said fitting can rock back and forth on said rod at various different angles with respect to said rod in such a manner that there can be angular movement in two different directions,

a spacer means for preventing said fitting from moving along the length of said rod located on said rod on each side of said fitting,

an elongated self-supporting arm extending from said fitting,

a simulated ball secured to the extremity of said arm remote from said fitting,

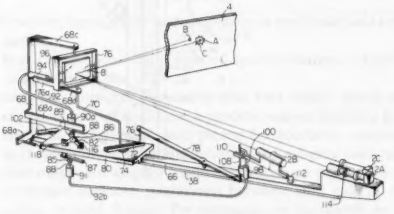
a counterweight operatively connected to said arm remote from said ball,



two actuating means for hitting said ball so as to cause said ball to move back and forth,

each of said actuator means being capable of being manipulated so as to be positioned anywhere along said top surface on either side of said rod.

3,904,204
CLAY SHOOTING SIMULATION SYSTEM
Gunpei Yokoi, Kyoto, Japan, assignor to Nintendo Co., Ltd., Kyoto, Japan
Filed Jan. 31, 1974, Ser. No. 438,262
Claims priority, application Japan, Feb. 11, 1973, 48-17279; Feb. 10, 1973, 48-17844; Feb. 11, 1973, 48-17280; May 12, 1973, 48-56175[U]
Int. Cl. F41j *5/02*
U.S. Cl. 273—101.1 **14 Claims**



1. A clay shooting simulation system comprising, in combination, a screen, at least a first projector adapted to project a visible light mark to be focussed on said screen, at least a second projector adapted to project an invisible light mark to be focussed on said screen, at least one mirror means adapted to reflect the visible light mark and the invisible light mark projected by said first and second projectors respectively to said screen, at least one means for providing continuous movements of said mirror means and said second projector with a specific continuous relative movement between the visible mark and the invisible mark on said screen such that the visible mark moves along a locus simulating an actual flying locus of a clay pigeon and the invisible mark always exists at a positon leading the visible mark so that the invisible mark simulates a lead-sighting point with respect to the visible mark, at least one light-receiving type gun adapted to receive a light beam reflected from the invisible mark on said screen and means responsive only to a reception of the invisible light beam by said gun for informing a hitting.

3,904,205

SHUTTLECOCK

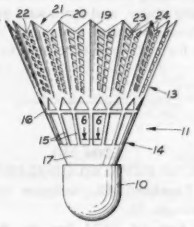
Maurice Robinson, "Wynyard" Forshaw Heath Rd., Solihull, England

Filed June 11, 1973, Ser. No. 368,664

Claims priority, application United Kingdom, June 16, 1972, 28379/72; June 16, 1972, 28401/72; June 16, 1972, 28402/72

Int. Cl.[2] A63B 67/18

U.S. Cl. 273—106 A 7 Claims



1. A shuttlecock skirt comprising a lower skirt and an upper skirt, the upper skirt being resilient and having a plurality of radially spaced longitudinally extending stems which are of channel section over at least a portion of their length and further having, intermediate said stems, a lattice structure which defines a plurality of angled slots which serve to introduce spin when the shuttlecock is in flight, the lower skirt comprising a plurality of radially spaced longitudinally extending stems of triangular section.

3,904,206

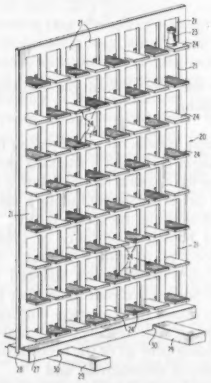
UPRIGHT CHECKERS AND CHESS GAME APPARATUS

Stanley J. Kolwicz, 16 Sanford Ave., Emerson, N.J. 07630

Continuation-in-part of Ser. No. 268,887, July 3, 1972, Pat. No. 3,781,014. This application Dec. 20, 1973, Ser. No. 426,565. The portion of the term of this patent subsequent to Dec. 25, 1990, has been disclaimed.

Int. Cl. A63f 3/02

U.S. Cl. 273—131 AC 10 Claims



1. A game apparatus comprising a checker type game board for use in an upright position, said game board having a checkerboard pattern on both faces thereof formed by vertical and horizontal intersecting rows of checkerboard rectangles, all rectangles in said rows formed by through openings in the board, horizontal game piece support elements detachably mountable upon the board at the bottom edges of all of said through openings and projecting beyond at least one of the opposite vertical faces of the board substantially at right angles to such faces, and supporting base means for the board holding it in an upright use position.

3,904,207

WORD GAME

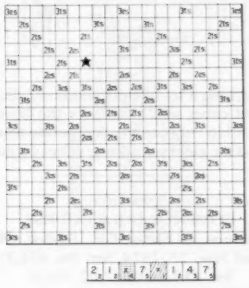
Edward Maurice Gold, Regent Buildings, Cnr. Manners & Lombard Sts., Wellington, New Zealand

Filed Jan. 21, 1974, Ser. No. 435,316

Claims priority, application New Zealand, Apr. 19, 1973, 170488

Int. Cl.[2] A63F 3/00

U.S. Cl. 273—135 R 2 Claims



1. A board game comprising a board subdivided laterally and longitudinally into squares, and a plurality of tiles, each square being dimensioned to accommodate one tile thereon, the tiles being classified into three sets of different color, the tiles of one set each bearing a numeral designation from 0 to 9, the tiles of a second set each bearing an arithmetical operator designator, said designators consisting of + (plus), − (minus), × (multiplication), ÷ (division), . (decimal) and /(fraction), the tiles of the third set bearing the designation = (equals), each tile further bearing an additonal numeral designation indicating a numerical value assigned to the respective tile, said tiles being arrangable on the squares on said board to indicate an arithmetical equation, means on one of said squares for indicating a starting position on which one of the tiles of the first equation placed on the board must be disposed, and means defining five classes of squares on said board, one class having no effect on the numerical value assigned to the tile placed thereon, a second class representing a first multiplicand of the numerical value assigned to a tile placed thereon, a third class representing a second multiplicand of the numerical value assigned to a tile placed thereon, a fourth class representing a first multiplicand of the sum of the numerical values of the tiles in an equation one tile of which is placed thereon, and a fifth class representing a second multiplicand of the sum of the numerical values of the tiles in an equation one tile of which is placed thereon.

3,904,208

PSEUDO FOUR DIMENSIONAL DICE AND GAME

Jack J. Grossman, 328 Seventh St., Manhattan Beach, Calif. 90266

Filed May 14, 1973, Ser. No. 359,773

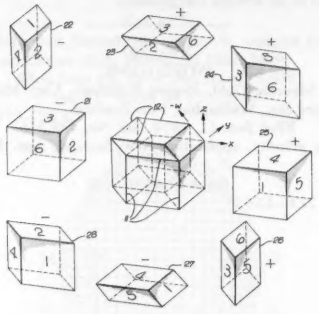
Int. Cl. A63f 3/00, 9/04

U.S. Cl. 273—146 1 Claim

1. A game comprising:

one or more die each having a three dimensional configuration representing a four dimensional tesseract composed of 16 vertices, 12 edges, 24 faces, and eight volumes or cubes, said eight cubes being interrelated in that each face of said tesseract is shared by a pair of said cubes; and

at least one of said die is in the shape of a dodecahedron having 12 external faces of a degenerate tesseract; and



further comprising a set of eight additional dice in the form of the eight cubes which compose the tesseract to show the relationship between the degenerate tesseract configuration and the eight volumes or cubes contained therein.

3,904,209

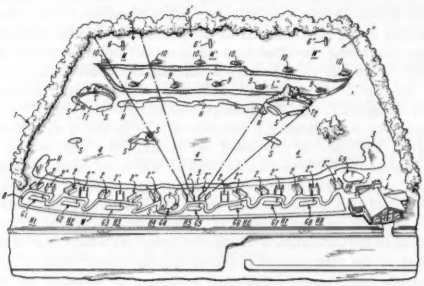
COMPACT GOLF COURSE

Clarence A. Thomas, 48 Shafor Cir., Dayton, Ohio 45409

Filed Mar. 25, 1974, Ser. No. 454,371

Int. Cl.[2] A63B *67/02, 69/36*

U.S. Cl. 273—176 A **8 Claims**



1. A compact golf course, comprising:

a common fairway for a plurality of distinct golf hole areas;

a plurality of non-walking fairway target areas formed in said common fairway and each having visually differentiated distance target portions;

a plurality of target greens spaced from one another and formed in said common fairway;

a plurality of fairway hitting chutes, one located at each of selected golf hole areas and aligned with a corresponding fairway target area;

a plurality of green approach hitting chutes, one located at each of said golf hole areas and aligned with a corresponding target green;

a divider means defining each of said hitting chute to restrict a player's view of said common fairway area substantially to the target area or target green with which the hitting chute is aligned, said golf hole areas and their corresponding hitting chutes being spaced along said common fairway and angled with respect thereto to present to a player's view different angular orientations of said fairway target areas and said target greens, said hitting chutes being further spaced and angled along said common fairway so that at least two fair-way hitting chutes corresponding to different golf hole areas are aligned with a common fairway target areas but from substantially different angular orientations, and so that at least two green approach hitting chutes corresponding to different golf hole areas are aligned with a common target green but from a substantially different angular orientation; and

a plurality of putting greens, one located at each of said golf hole areas, each putting green being remote from the target green to which its hole area corresponds, whereby a player may play a game of golf by hitting golf balls from said fairway hitting chute, for those hole areas having a fairway hitting chute, and from said green approach hitting chute, and thereafter putting on said putting green, in sequence for each golf hole area in turn.

3,904,210

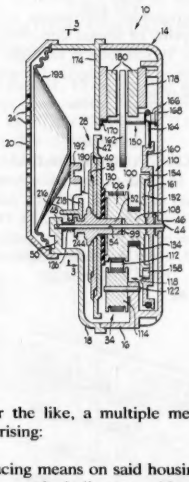
SOUND REPRODUCING DEVICE

Gunars Licitis, Lombard, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.

Filed Feb. 19, 1974, Ser. No. 443,335

Int. Cl.[2] G11B *3/78*

U.S. Cl. 274—1 A **14 Claims**



1. In a toy or the like, a multiple message reproducing apparatus, comprising:

a housing;

sound reproducing means on said housing for reproducing audible messages including a tracking portion and drive means for moving a sound record relative to said tracking portion, said drive means including a spring motor and pull string for winding the spring motor;

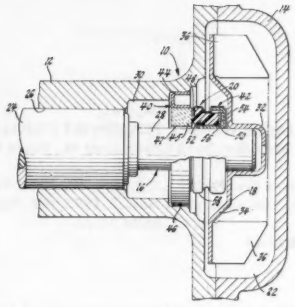
a sound record having a plurality of relatively movable adjacent record parts with a plurality of sound track portions on each record part adapted to be engaged seriatim from one record part to another by said tracking portion, each sound track portion containing a different message so that a substantially continuous sound track is formed extending over all of the record parts as the tracking portion moves thereacross; and

random indexing means for releasably locking said record parts in any relative angular arrangement and for causing free and random relative movement of the record parts when they are released, said pull string being operatively assoicated with said indexing means for actuating the indexing means in response to tension on the string whereby the content of the continuous sound track changes randomly.

3,904,211
ROTARY FACE SEAL

Robert L. Dega, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 3, 1973, Ser. No. 421,422
Int. Cl. F16k *15/40*
U.S. Cl. 277—32 1 Claim



1. In a motor vehicle water pump having a housing defining a pumping cavity and a rotatable shaft extending into the cavity and carrying an impeller for pumping coolant therethrough, a rotary face seal for sealing the space between the housing and the shaft for preventing the leakage of coolant from the cavity comprising:

an annular retainer fixedly connected to the housing;

an annular ceramic seal head carried by the retainer and through which the shaft projects, said seal head having a flat radial sealing surface disposed in the cavity coaxial with the shaft;

a seal cup having a cylindrical hub carried by the shaft and axially spaced from the seal head and a radial flange extending outwardly from one end of the hub and terminating with a reversely directed cylindrical rim partially overlying the hub;

an annular sealing ring formed of a material softer than the seal head, said sealing ring being loosely received over the hub and axially slidable between the hub and the rim, said sealing ring having a cylindrical body with an enlarged annular shoulder at the end remote from the flange, said shoulder being axially spaced from the rim to define therebetween a groove, the depth of the groove being selected to provide a predetermined hydrostatic balancing on the ring under coolant pressure;

an annular axially projecting seal land on the end surface of the body, said land having a flat surface engageable with the sealing surface of said seal head;

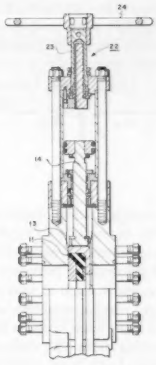
a compression spring operatively connected between said sealing ring and said flange, said spring axially biasing said seal land into sealing engagement with the sealing surface of said seal head;

and a cylindrical sealing boot formed of a heat shrinkable material, said boot conforming to the outer contours of the shoulder, the groove, and the rim, said boot establishing a flexible section at said groove which permits limited axial movement of the ring to accommodate parts misalignment and torsionally interconnects said sealing ring and said seal cup in unitized assembly, said boot preventing leakage between said seal cup and said sealing ring and restraining relative rotation of said sealing ring relative to said seal cup while torsionally yielding to damp out vibrations.

3,904,212
WELL BLOWOUT PREVENTER HAVING IMPROVED FEED SCREW APPARATUS

Toby S. Pugh, Fort Worth, and Henry W. Blackwell, Venus, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed June 4, 1973, Ser. No. 367,018
Int. Cl.[2] E21B *33/00*
U.S. Cl. 277—126 7 Claims



1. An apparatus for advancing a feed screw, comprising:

a housing;

an indexing tab secured to said housing;

a threaded feed screw having an elongated groove along at least a portion of its peripheral longitudinal surface, said tab being located within said groove, whereby said feed screw is secured against rotation with respect to said housing;

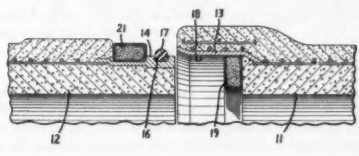
a threaded bushing threadedly engaging said threaded feed screw; and

means to rotate said bushing to thereby advance said feed screw with respect to said housing.

3,904,213
CORROSION PROTECTIVE BAND FOR UNDERGROUND PIPE JOINTS WITH METAL PARTS

Harold V. Swanson, Morris Plains, and Robert E. Bald, Roseland, both of N.J., assignors to Interpace Corporation, Parsippany, N.J.

Continuation-in-part of Ser. No. 359,967, May 14, 1973. This application Nov. 22, 1974, Ser. No. 526,320
Int. Cl.[2] F16J *15/38*
U.S. Cl. 277—229 6 Claims



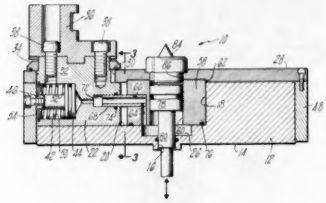
1. A distortable band, suitable for being fit into a joint between first and second continuous successive lengths of pipe made of ceramic earthen material wherein a bell formed on one end of the first length is engaged by a spigot formed on an end of a second length, the band made of a cellular water invadable material impregnated with a dry hydratable cement which is reactive with water to hydrate thereby depositing a water impervious hard substance in the joint.

3,904,214

FLUID OPERATED COMPENSATING CHUCK

William James Manchester, Durham, Conn., assignor to Power Hold Products, Inc., Rockfall, Conn.

Filed Jan. 9, 1974, Ser. No. 431,687
Int. Cl.[2] B23B 31/30
U.S. Cl. 279—4 **8 Claims**



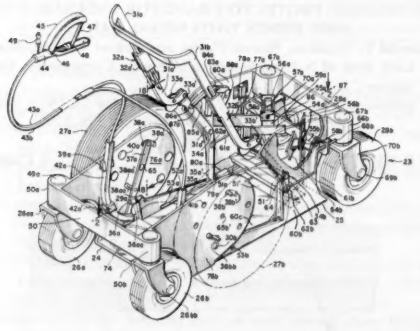
1. A fluid operated compensating chuck comprising a chuck body having a plurality of radially extending jaw guideways, master jaws slideably mounted in each of said guideways for reciprocal movement therealong between an actuated position and a retracted position, each of said jaws having a cylinder therein, a stationary piston mounted within each cylinder and fixedly secured to the chuck body, a first fluid passage in each jaw communicating with the cylinder and moveable therewith relative to the chuck body and the stationary piston, a second fluid passage for each jaw fixedly secured to said chuck body and directly interconnected to the first fluid passage to permit relative movement therebetween upon reciprocal movement of the master jaws and a fluid actuator associated with said second fluid passages for pressurizing fluid in said passages and said cylinders and driving the jaws toward their actuated positions.

3,904,215

WALKING ROLLER SKATE

Andrew Bardy, 235 E. 74th St., New York, N.Y. 10021

Continuation-in-part of Ser. No. 361,502, May 18, 1973. This application Oct. 4, 1974, Ser. No. 512,103
Int. Cl.[2] A63C 17/20
U.S. Cl. 280—11.2 **28 Claims**



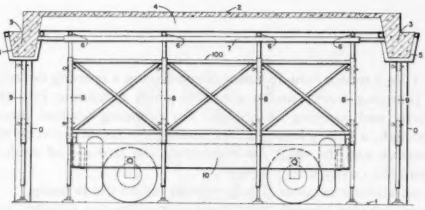
1. A walking skate device comprising in combination: substantially separate forward and rearward platform structures having upper and lower faces thereof; platform hinge means pivotably hinging a rearward portion of said forward platform structure to a forward portion of said rearward platform structure; a first pair of spaced-apart wheels mounted on a forward portion of said forward platform structure, one on each of opposite sides thereof; a second pair of spaced-apart wheels mounted on a rearward portion of said forward platform structure, one on each of opposite sides thereof; rear wheel means for rollable support of and mounted on a rearward portion of said rearward platform structure; forward-foot securing means for detachably affixing said forward platform to a forward part of a person's foot; a rearward-foot securing means for detachably affixing said rearward platform to a rearward part of a person's foot; and brake means for applying controllably and intermittently braking forces to said second pair of spaced-apart wheels.

3,904,216

VARIABLE HEIGHT TRANSPORT CARRIAGE

Charles E. Metrailer, 3613 Government St., Baton Rouge, La. 70802

Division of Ser. No. 203,273, Nov. 30, 1971, Pat. No. 3,744,945. This application Nov. 7, 1972, Ser. No. 304,548
Int. Cl. B62d 61/12
U.S. Cl. 280—43 **4 Claims**

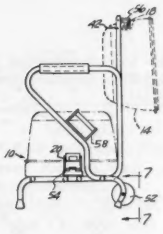


1. In a carriage readily adaptable for transport of a concrete form or other workpiece, said carriage comprising a frame of channel members, two sets of wheels mounted upon said frame, either set of which is capable of independently supporting the carriage while the other is retracted, one set of which is mounted at a 90° angle relative to the other as determined by the normal direction of movement of the carriage when a set of wheels is in supporting position, the improvement comprising eccentric wheel mounting members equal in number to the number of wheels, each being pivotally mounted via a bolt which extends through a bearing element within the frame of the carriage, each eccentric member carrying on its other end a spindle on which is mounted a wheel provided with a pneumatic tire, the eccentrics of each set of wheels being capable of rotation to permit incremental adjustments and clamping and unclamping of the wheels at different levels of elevation to lower or raise the carriage by an alternate sequence of adjustments of the eccentrics, with deflation and inflation of the tires; lowering the carriage in a series of alternative steps, as when the carriage is at a given height and supported by one set of wheels, the tires of which are deflated, while the other set of wheels, with eccentrics clamped, are in raised position, deflating the tires of the set of supporting wheels and lowering the carriage until the other set of wheels become supporting of the carriage, unclamping the eccentrics of the set of now non-supporting wheels and reinflating the tires to cause the eccentrics to rotate upwardly and then reclamping the eccentrics; and raising the carriage by reversal of this sequence of steps of adjustments of the eccentrics, with deflation and inflation of the tires.

3,904,217
SUPPORT STAND FOR A SELF-CONTAINED TOILET APPARATUS

Charles L. Sargent, Ypsilanti, and Edward J. Hutcheson, Ann Arbor, both of Mich., assignors to Thetford Corporation, Ann Arbor, Mich.

Division of Ser. No. 249,633, May 2, 1972, abandoned. This application Sept. 7, 1973, Ser. No. 395,154
Int. Cl.[2] B62B *1/12*
U.S. Cl. 280—47.25 **3 Claims**

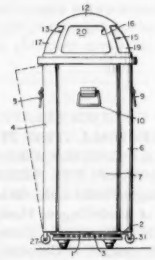


1. A stand for supporting and transporting a portable self-contained toilet comprising a base portion on which the bottom of the toilet can be supported and having front and rear legs for resting on a supporting surface, arm rest portions of generally inverted U-shape extending upward from opposite sides of said base portion, and a back portion of generally inverted U-shape extending upward from the rear of said base portion, said base portion having brackets extending upward adjacent to its opposite sides for securing the portable toilet on the base portion and wheels mounted on said rear legs in spaced relation to the supporting surface and located so that when the stand is tilted rearwardly on the rear legs the wheels will engage the supporting surface for moving the stand on the wheels.

3,904,218
COMPLEMENTARY TRASH CAN UNIT

Eleanor E. Kostic, Andover, Conn., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Oct. 31, 1973, Ser. No. 411,470
Int. Cl.[2] B60B *3/02*
U.S. Cl. 280—79.2 **5 Claims**

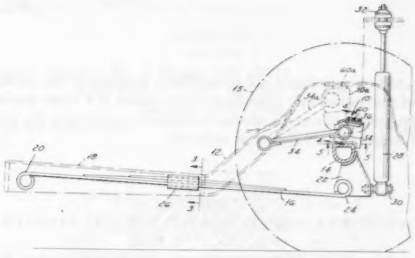


1. A complementary trash can unit, comprising
a movable base member;
a platform rotatably mounted on the base member for free rotation in a plane substantially parallel to the plane of the base member;
a plurality of trash cans of the same configuration each complementing the others and resting on the platform;
holding means at the bottom of each of the trash cans and formed in the platform for releasably holding the cans on the platform;
wheels on the bottom of each of the trash cans for permitting movement of each can on the ground after removal from the platform; and
a common cover covering the cans in position on the platform.

3,904,219
VEHICLE SUSPENSION BUMPER

Charles P. Guerriero, Dearborn Heights, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 4, 1974, Ser. No. 512,389
Int. Cl.[2] B60G *11/24, 11/40*
U.S. Cl. 280—124 R **7 Claims**



1. A vehicle suspension bumper comprising a bracket constructed to be connected to a first suspension component,
said bracket having a pair of side walls and an interconnecting wall connecting said side walls,
said interconnecting wall having a mid-portion and a pair of end portions,
said interconnecting wall having a pair of slots with one of said slots being situated between one of said end portions and said mid-portion and the other of said slots being situated between the other of said end portions and said mid-portion,
a resilient element having a mid-portion and a pair of end portions,
said resilient element being constructed to engage a second suspension component,
said resilient element extending through said slots with its mid-portion disposed outwardly of said mid-portion of said interconnecting wall and its end portions disposed inwardly of said end portions of said interconnecting wall.

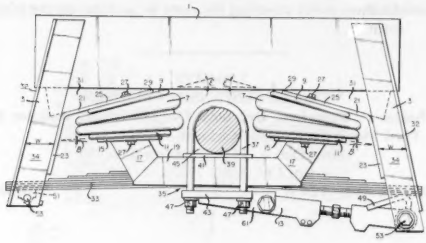
3,904,220
COMPACT HIGH STRENGTH AUXILIARY LIFT AXLE SUSPENSION SYSTEM

Raymond L. Fier, Massillon, Ohio, assignor to TWM Manufacturing Company, Inc., Canton, Ohio

Filed June 3, 1974, Ser. No. 476,009
Int. Cl.[2] B60G *11/48*
U.S. Cl. 280—124 F **9 Claims**

1. In an auxiliary axle suspension system for a wheeled vehicle having axle and wheel means which provide a primary means of vehicle support and at least one longitudinally extending frame member, the auxiliary axle suspension system comprising a relatively short frame rail for connecting the system to the vehicle frame member, at least one leaf spring, a pair of vertically flexible pneumatic chambers, downwardly extending spring hanger brackets connected at substantially the ends of the frame rail for retaining the leaf spring at its ends, means for connecting the leaf spring at a point intermediate its ends to an auxiliary axle and means locating the pneumatic chambers within the system such that one is fore

and one is aft of said connecting means, said leaf spring being located substantially directly under said longitudinally extending frame member of said vehicle when the system is connected via said frame rail to the frame member of the vehicle, and said pneumatic chambers being canted at a finite angle in a longitudinally space saving configuration, whereby the overall length of said system is reduced.



3,904,221
GAS GENERATING SYSTEM FOR THE INFLATION OF A PROTECTIVE BAG

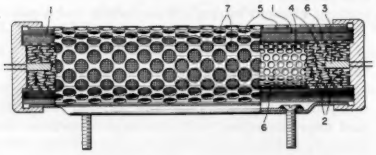
Takehiko Shiki; Tadamasa Harada, both of Nobeoka; Ikuo Harada, Tokyo, and Masaaki Shiga, Kami-Fukuoka, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Japan

Filed May 10, 1973, Ser. No. 358,931

Claims priority, application Japan, May 19, 1972, 47-49743; Mar. 3, 1973, 48-25527; May 23, 1972, 47-60085[U]; May 23, 1972, 47-60086[U]; May 29, 1972, 47-63103[U]

Int. Cl.² B60R *21/08*

U.S. Cl. 280—150 AB **3 Claims**



1. A gas generating system for the inflation of a protective bag to cushion a passenger from impact with the structure of a high speed vehicle comprising (1) a chamber surrounded by a layer of metal wire gauzes wherein said layer has a heat capacity above 5 calories/℃ per 1 mol of the generated nitrogen gas, having a ratio of total surface area of the wires to the total volume of the wires in the range of 150–400 cm^{-1}, having a fractional void in the range of 60–90%, and having a thickness of 0.3–3 cm, (2) a gas generating chemical composition enclosed in the chamber, wherein said chemical composition is composed of (a) at least one metal azide selected from the group of alkali metal azides, alkali earth metal azides and hydroxy metal azides having the general formula $M(OH)_m(N_3)_n$, wherein M represents Mg, Ca, Mn, Co and Ni, N represents nitrogen atoms, and *m,n* represent a positive number respectively where *m* plus *n* means atomic valency of M, and (b) at least one oxidizing agent, (3) at least one ignition tube for igniting said chemical composition in the chamber.

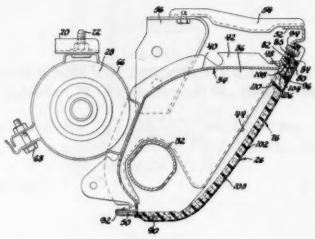
3,904,222
OCCUPANT RESTRAINT SYSTEM

Leslie W. Bursott, Utica; Robert M. Caldwell, Rochester, and Donald K. Cameron, Fraser, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 3, 1973, Ser. No. 420,798

Int. Cl.² B60R *21/08*

U.S. Cl. 280—150 AB **4 Claims**



1. The combination comprising, a vehicle body having an instrument panel structure, an occupant restraint cushion housing having an elongated opening, an inflatable occupant restraint cushion mounted within the housing for deployment therefrom through the opening when the cushion is inflated, a cover assembly mounted on the instrument panel structure in covering relationship to the housing, said cover assembly including flange means defining the side and upper edges of an elongated opening generally coextensive of the housing opening and a closure hinged to the lower edge of the opening for movement between open and closed positions with respect to the opening thereof, said closure including an outer flexible member and an inner layer of foam plastic material formed into flanges at the side and upper edges thereof which underlie respective flange means of the cover assembly to releasably hold the closure against movement to an open position outwardly of the cover assembly opening and being ineffective to hold the closure against movement inwardly of the cover assembly opening, and rib means formed integral with the inner layer of the closure at the edges thereof and engageable with the restraint cushion housing to block movement of the closure inwardly of the cover assembly opening.

3,904,223
PROTECTIVE INSTALLATION FOR COVERING WINDSHIELD COLUMNS, ROOF FRAMES AND REAR WINDOW COLUMNS ON THE INSIDE OF A VEHICLE

Karl Wilfert, Gerlingen-Waldstadt; Béla Barényi; Heinrich Haselmann, both of Sindelfingen; Hansjürgen Scholz, Echterdingen; Hans-Gerd Backhaus, Holzgerlingen, and Luigi Brambilla, Sindelfingen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Oct. 4, 1974, Ser. No. 512,359

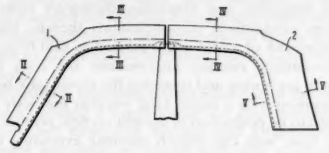
Claims priority, application Germany, Oct. 4, 1973, 2349830

Int. Cl.² B60R *21/04*

U.S. Cl. 280—150 B **20 Claims**

1. A protective installation for covering off structural parts in the interior space of a vehicle, which includes a plastically deformable padded deformation means, characterized in that

a hollow body serves as deformation means which faces the vehicle interior space with a curved surface thereof and which



is provided on the back side thereof with fastening surfaces which are substantially matched to the parts to be covered off.

3,904,224

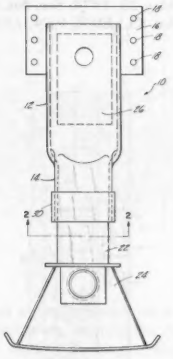
LANDING GEAR HOUSING FOR TRAILERS

Jack T. Belke, Grand Rapids, Mich., assignor to Westran Corporation, Muskegon, Mich.

Filed Oct. 15, 1974, Ser. No. 514,543

Int. Cl.[2] B60S *9/02*

U.S. Cl. 280—150.5 **4 Claims**



1. A landing gear housing for a trailer comprising an upper cylindrical portion having means for attaching said cylindrical portion to said trailer and a lower square tubular portion coaxial with said cylindrical portion, wherein said cylindrical portion and said square tubular portion are of integral construction.

3,904,225

ADJUSTABLE TRAILER HITCH

Jimmie George, P. O. Box 212, and Charles P. Tyson, Rt. 1, both of Mer Rouge, La. 71261

Filed July 29, 1974, Ser. No. 492,679

Int. Cl.[2] B60D *1/00*

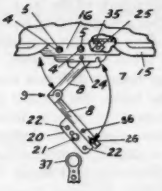
U.S. Cl. 280—478 R **9 Claims**

1. An adjustable trailer hitch comprising:

a. a hollow frame capable of being mounted on a vehicle for housing a hitch arm;

b. an arm pivoted to said frame at one end thereof, said arm having an elbow hinge intermediate the ends thereof subdividing said arm into a pair of pivotal arm members relatively movable about said hinge and including stop portions which abut to form an angle of about ninety degrees when said arm is fully extended about said hinge and pivoted out of said frame, and to fold about said hinge into parallel abutting relation when said arm is pivoted into a fully retracted position within said frame;

c. means carried by the free end of said arm for releasably



locking to a trailer to permit towing of said trailer by said vehicle.

3,904,226

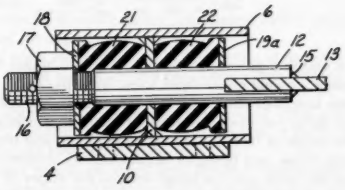
HITCH

Carl J. Smalley, Rt. 2, Berne, Ind. 46711

Filed Sept. 4, 1973, Ser. No. 394,304

Int. Cl.[2] B60D *1/00*

U.S. Cl. 280—486 **1 Claim**



1. In hitch construction in combination, a mounting member, a tubular housing connected thereto, connecting instrumentalities within said housing, said instrumentalities including a connector extending out of the housing, a connecting part fastened to the connector, a load transfer element fixed to the housing, said part extending through said element, restraining means carried by the instumentalities and shock absorbing means intermediate the restraining means and the transfer element whereby a load tending to move the connector in and out of the housing will be cushioned in movement in both directions and comprises elastomeric compressible bushings mounted on the connecting part at opposite sides of the load transfer element and between the restraining means and contained entirely within the housing, the cross-sectional area of the housing being greater than that of the bushings, the connecting part includes a nut disposed at least partially outside said housing and positioned to adjust the compression including prestressing of the bushings whereby to vary the deflection directed to the connector, the total deflection being limited by the diameter and length of the housing within which the bushings are confined, which is proportioned to limit the diameter and length to which the bushings may be deflected.

3,904,227

SELF-BINDER FOR BOOKS, PAMPHLETS AND THE LIKE

Bernard T. Sendor, Westbury, N.Y., assignor to Bookwrights, Inc., Scarsdale, N.Y.

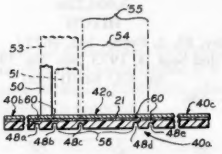
Filed Apr. 25, 1973, Ser. No. 354,434

Int. Cl.[2] B42D *3/00*

U.S. Cl. 281—29 **4 Claims**

1. A book-binding construction for rebinding books, of different size and thickness which have damaged or worn or missing covers, including in combination a book which has front, back and spine portions, a rebinder comprising a sheet of material, the thickness of most areas of the sheet being too

stiff to bend as hinges of the rebinder and too stiff for bending around the edges of an original cover of the book, the rebinder having front and back cover panels and a spine panel covering the corresponding parts of the book, preformed grooves parallel to one another and including more than two grooves in the spine portion of the rebinder providing greater local flexibility than the other areas of the rebinder and located in positions to provide hinge lines at different regions depending upon the thickness of the book, the parallel grooves being a series of hinge line grooves in which different distances between grooves constitute a geometrical progression whereby some of the spaces are multiples of other spaces for accurate matching of the book thickness and hinge line spacing, with fewer grooves, by shifting the book transversely of the hinge lines, the strength of the hinge lines being sufficient for an original cover, the sheet material being a continuous piece that extends across the front and back portions and the spine portion of the



book and said grooves providing substitute hinges for holding in place original covers torn loose from the spine along part of the length of the hinge lines of said covers, the front and back cover panels of the rebinder being approximately parallel throughout their full extent to the front and rear portions of the book and being of approximately uniform thickness from the spine portion hinge lines to the edges of said cover panels of the rebinder, pressure-sensitive adhesive covering the inside of the rebinder that contacts with the front and back of the book, the pressure-sensitive adhesive being of a nature useable with release sheets for covering said adhesive and for stripping off prior to the application of the cover to the book, said sheet material extending beyond the edges of the front and back of the book, and the sheet material being of a consistency that can be trimmed off, with scissors, flush or to any desired extent of overhang with respect to the front and back portions of the book.

3,904,228

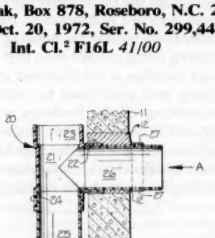
SEPTIC TANK TEE

Ernest J. Maroschak, Box 878, Roseboro, N.C. 28382

Filed Oct. 20, 1972, Ser. No. 299,448

Int. Cl.² F16L *41/00*

U.S. Cl. 285—156 **9 Claims**



1. A septic tank tee formed of plastic and adapted to be used with a septic tank and comprising a plastic elongate tubular body member having open opposite ends and a plastic relatively short tubular branch member also having open opposite ends with one end being secured to the body member intermediate the ends of the body member for fluid communication therewith and extending outwardly from the body member substantially perpendicularly thereto, the combination therewith of a split collar carried by said branch member in surrounding relation intermediate the ends thereof for aiding in anchoring and retaining the septic tank tee in operative position with a septic tank wherein the body member is adapted to be positioned in upright vertical position within the septic tank with the branch member extending through an opening in the side wall of the septic tank, the end of said split collar closest to said body member serving to define shoulder means extending outwardly from said branch member and adapted to engage the outer wall of the septic tank, said split collar having circumferentially spaced apart end portions and an outer circumferential extent corresponding substantially to the outer circumference of said branch member carrying the same, and means securing said split collar to said branch member.

3,904,229

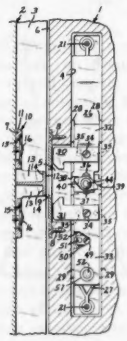
SLIDING DOOR LOCK

Russell W. Waldo, St. Paul, Minn., assignor to Ideal Security Hardware Corporation, St. Paul, Minn.

Filed May 23, 1974, Ser. No. 473,059

Int. Cl.² E05C *9/04, 13/02*

U.S. Cl. 292—29 **3 Claims**



1. A door lock for a sliding door mounted in a frame for movements toward and away from a closed position in operative engagement with a cooperating frame member, said latch comprising:

a. a pair of elongated support members adapted to be mounted in opposed parallel relationship in an opening extending transversely through a door adjacent an edge of the door, one of said support members including longitudinally aligned pairs of laterally spaced guide flanges;

b. a pair of opposed latch hooks;

c. a pair of slide elements each connected to a different one of said latch hooks and each longitudinally slidable between a different pair of said guide flanges, said slide elements having overlapping inner end portions and aligned longitudinally extending slots through said overlapping portions;

d. a transverse shaft on said one of the support members extending through said slots;

e. slide element mounting means including a lever journaled intermediate its ends on said shaft for holding said slide elements between their respective guide flanges;

f. connections between said lever and said slide elements for imparting longitudinal movement to one of said slide elements in one direction responsive to longitudinal

movement of the other slide element in the opposite direction;

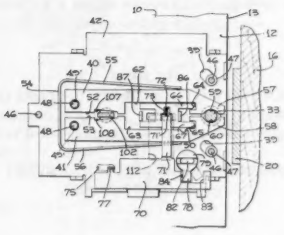
g. a strike adapted to be mounted on a door frame, said strike having opposite sides, each including a surface portion disposed for hooking engagement with a different one of said latch hooks, when the door is closed and said latch hooks are moved toward their respective portions of said strike;

h. and an actuator including a shaft, said one of the support members defining a longitudinal slot therethrough, said actuator shaft extending through said longitudinal slot and being journaled in one of said slide elements for limited rotation relative to said one of the slide elements and for sliding movements therewith longitudinally of the support members.

3,904,230
TWO STAGE LOCK

William Fane, North Vancouver; Dennis Potter, Delta, and Joseph Potschka, Vancouver, all of Canada, assignors to Norris Industries, Inc., South Gate, Calif.

Filed June 7, 1974, Ser. No. 477,403
Int. Cl.² E05C *3/40*
U.S. Cl. 292—49 **20 Claims**



1. A lock adapted to be mounted on a hinged panel for engagement with a strike pin wherein the strike pin has a first peripheral reduced section forming a stop shoulder for a partially closed position of the panel and a second peripheral reduced section forming a stop shoulder for a full closed position of the panel longitudinally spaced from the first peripheral reduced section and wherein said pin has a mounting on the face of a surrounding structure,

said lock comprising

a frame including a base plate for engagement with the panel and a structural plate parallel to and spaced from the base plate forming a chamber therebetween,

complementary latching elements in the chamber each having a pivotal mounting at one end on the frame and an operating edge in face to face relationship with the opposite edge,

a jaw at the other end of each latching element including means forming a latching recess in at least one of said edges and adapted to receive the reduced sections of the strike pin,

means forming a latch bolt recess in at least one of said edges and a latch bolt slidably mounted in said latch bolt recess,

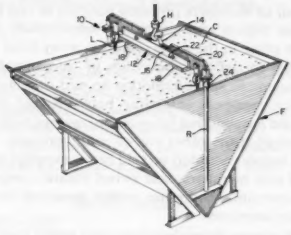
means forming a lock pocket at one end of the latch bolt recess adapted to receive an adjacent end of the latch bolt in locked position,

a latch bolt operator adjacent the exterior of said frame extending into operating engagement with the latch bolt, and unlatching means comprising a handle rotatably mounted on said frame and a spindle extending between said latching elements adapted upon rotation to move said latching elements away from each other.

3,904,231
FORM JACK AND HOIST CONNECTOR FOR STRIPPING AND LIFTING A MASONRY CASTING FROM A FORM

William C. Lyons, 186 Damascus Rd., Branford, Conn. 06405

Filed Aug. 8, 1974, Ser. No. 495,873
Int. Cl.² B22D *29/08;* **B66C** *1/42*
U.S. Cl. 294—67 DA **7 Claims**



1. A form jack for stripping a finished masonry casting from a form in which is has been poured, said jack comprising in combination:

a central beam member having attachment means centrally thereof for engagement by a hoist;

a pair of arms, each such arm being pivoted at its inner end to an end of said beam and projecting axially outward of such beam end;

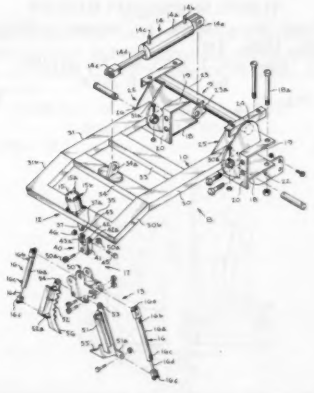
bearing means at the projecting free end of each arm for making bearing engagement with a portion of the form to be stripped from the casting; and

attachment means on each arm, located intermediate its respective free end bearing means and end of said central beam, for engaging and supporting the casting.

3,904,232
GRAPPLE ARRANGEMENT FOR VEHICLE

Clauriste H. Byles, Hwy. 171 North, Many, La. 71449

Filed Apr. 17, 1974, Ser. No. 461,555
Int. Cl.² B66C *1/42*
U.S. Cl. 294—88 **1 Claim**



1. A grapple arrangement for mounting on a vehicle rear axle comprising:

a. frame means for positioning on the rear axle of a vehicle, said frame means including:

1. a pair of rectangular supports, said supports including:
   a. spaced, parallel plates; and
   b. a generally vertical plate extending therebetween and secured to said parallel plates;
2. a bracket arrangement mounted on said rectangular supports; and
3. a member extending between and secured to said bracket arrangement;

b. boom means, said boom means comprising:
1. a pair of members pivotally secured at one end to said frame means and extending substantially parallel to each other in the same direction away from said frame means to define other ends of said members which terminate in spaced relation to said one end; and
2. brace members extending between said members at spaced longitudinal intervals therealong with one brace member at the other end of said members;

c. swivel means mounted on said brace member at the other end of said members, said swivel means comprising:
1. a reversible hydraulic motor mounted on said one brace member;
2. shaft means depending from said motor and below said one brace member; and
3. bracket means secured to said shaft means;

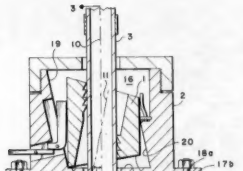
d. grapple means pivotally secured to said bracket means;
e. double acting hydraulic cylinder means pivotally secured at one end to said bracket means and piston rod means extending from said cylinder means and pivotally secured to said grapple means for opening and closing said grapple means; and
f. double acting hydraulic cylinder means pivotally secured at one end to said U-shaped frame means and piston rod means extending therefrom and pivotally connected to said boom means for raising and lowering said boom means;
g. said outermost portion of said pair of members adjacent said other ends extend in a plane downwardly relative to said one ends which are pivotally connected to said frame means;
h. means for engaging said frame means to removably position the grapple arrangement on a vehicle rear axle; and
i. conduit means for conducting fluid means to said double acting cylinder means and to said reversible hydraulic motor and to said double acting hydraulic cylinder means.

3,904,233

TUBING SUSPENSION HANGER

Robert Frank Berry, Dallas, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Nov. 1, 1973, Ser. No. 411,983
Int. Cl.[2] E21B *19/06*
U.S. Cl. 294—92 **11 Claims**



1. Well conduit clamping and suspension apparatus comprising:

pivotable unitary gripping sleeve means adapted to encircle a conduit and having a plurality of gripping teeth therein, said sleeve means having a dual axis bore passage passing longitudinally therethrough, with one axis of said bore passage canted at an acute angle to the other axis and one axial portion of said bore passage having said gripping teeth therein;

abutment means arranged to abut one side of said sleeve means and induce a rotational moment therein in response to downward movement of the well conduit against said gripping teeth; and,

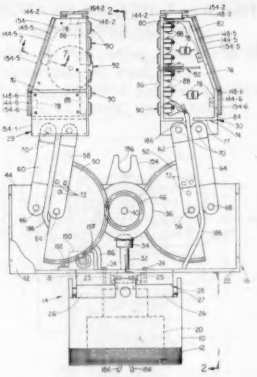
means for selectively pivoting said sleeve means on the well conduit and thereby abutting said teeth against the conduit.

3,904,234

MANIPULATOR WITH ELECTROMECHANICAL TRANSDUCER MEANS

John W. Hill, Palo Alto, and Antony J. Sword, San Francisco, both of Calif., assignors to Stanford Research Institute, Menlo Park, Calif.

Filed Oct. 15, 1973, Ser. No. 406,552
Int. Cl. B25b *11/00*
U.S. Cl. 294—106 **30 Claims**



1. In a manipulator of the type which includes a pair of relatively movable jaws having opposing jaw faces between which an object may be gripped, force transducer means at the face of at least one jaw for providing an electrical output related to the force applied thereto, said force transducer means comprising:

means forming a beam of light;

a photocell positioned to receive the light beam;

a light vane movable in opposite directions across the light beam path to vary the amount of light which reaches the photocell in accordance with the vane position;

means for resiliently biasing the vane in one direction; and

vane operating means connected to the vane and including a movable member at a jaw face for moving the vane in the opposite direction against the action of the resilient biasing means upon application of an external force thereto.

3,904,235

WEIGHTED CLAMP FOR HANDLING BUOYANT MATERIALS UNDER WATER

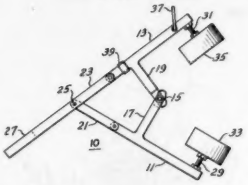
George V. Fehr, 587 Bushkill Rd., Nazareth, Pa. 18064

Filed Jan. 8, 1974, Ser. No. 431,660
Int. Cl. B66c *1/28*
U.S. Cl. 294—106 **4 Claims**

1. An improved weighted clamping means for gripping and manipulating buoyant objects under water comprising:

a. clamping jaw members arranged for movement toward and away from each other and adapted to grippingly contact opposite portions of said buoyant objects,

b. individual weighted means directly and rigidly associated with said jaw members and constituting a major portion of the weight of the clamping means positioned with respect to the remainder of the clamp structure such that the center of gravity of the clamping means is closely adjacent to a line passing between the jaw members such that when the jaw members are in clamping relationship



with said buoyant objects the center of gravity of said clamping means and buoyant objects together is closely adjacent to the center of buoyancy of said objects,

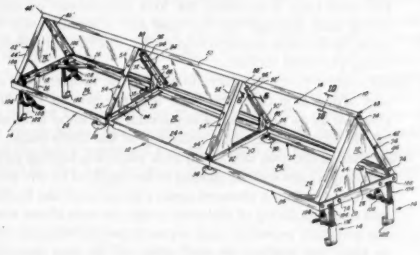
c. pivoted jaw mounting means upon one end of which the jaw members are mounted and arranged to move said jaw members inwardly to a clamping position in response to activation of a toggle means connected to an opposite portion of said jaw mounting means.

3,904,236

WIND DEFLECTOR FOR A TOWED TRAILER

Daniel H. Johnson, Chariton, and Harry T. Johnson, Williamson, both of Iowa, assignors to Camper-Flow Mfg. Co., Chariton, Iowa

Filed Aug. 19, 1974, Ser. No. 498,669
Int. Cl.[2] B62D *39/00*
U.S. Cl. 296—1 S **8 Claims**



1. A wind deflector for use on a motor vehicle of the type with which there is associated a separate wind resistance surface in the form of a towed trailer, a self-contained cargo compartment or a camper body attachment, said deflector comprising:

a first pair of spaced parallel rails having front and rear ends secured at corresponding ends to a second pair of spaced parallel rails of a greater length than said first pair of rails wherein said first pair of rails define the side rails and said second pair of rails define respectively the front and rear rails of a rectangular frame,

respective like upstanding supports carried by each side rail,

a rigid top brace connected to said supports at their upper extremity,

a wind deflector shield extending to and between said supports and secured thereto and to said top brace,

said wind deflector shield including a central bowed portion disposed forwardly from said front rail,

a reinforcement means on said frame centrally thereof intermediate said supports and secured to said front and rear rails and to said top brace,

said reinforcements means including an edge portion extending forwardly of said front rail and in abutting engagement with the bowed portion of said wind deflector shield, and

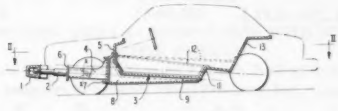
means to removably secure said frame to the roof of a vehicle so that said front and rear rails extend transversely of the direction of forward travel.

3,904,237

BUMPER ARRANGEMENT OF A MOTOR VEHICLE

Béla Barényi, Maichingen; Karl Wilfert, Gerlingen-Waldstadt, and Hermann Renner, Magstadt, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 9, 1973, Ser. No. 339,832
Claims priority, application Germany, Mar. 10, 1972, 2211560
Int. Cl. B62d *25/20*
U.S. Cl. 296—28 F **19 Claims**



1. An arrangement of a bumper installation at a support structure of a vehicle having sides, which arrangement comprises:

bumper means retained at an end portion of at least one shock absorber means, said shock absorber means having at least another end portion fixedly attached to said support structure,

wherein the axis of each of the at least one shock absorber means rises in the direction toward the bumper means, and

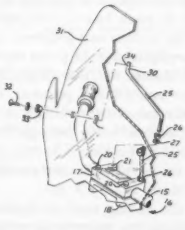
wherein the at least one shock absorber means is supported at mounting means secured at a part of the support structure forming a passenger space of the vehicle, whereby the rising of the shock absorber means in the direction of the bumper means improves absorption of deformation forces due to impact on the bumper means.

3,904,238

SUPPORT FOR MOTORCYCLE FAIRING

H. Dwight Anderson, 2624 W. River Rd., Minneapolis, Minn. 55406, and David L. Travis, Star Rt., Box 481, Loveland, Colo. 80537

Filed Feb. 15, 1974, Ser. No. 443,017
Int. Cl.[2] B62J *17/04*
U.S. Cl. 296—78.1 **4 Claims**



1. In a motorcycle having handlebars and clamp means for said handlebars comprising two portions and at least two threaded openings in one of said two portions with axially

aligning openings in the other portion, the improvement comprising a pair of elongated threaded rod members threaded in said openings of said one portion and passing through the openings of the other portion respectively, a pair of tightenable nuts threaded on said rod members to engage said other portion for clamping said portions of said clamp means together to clamp said handlebars subsequent to threading the rod members into the threaded openings, said rod members including unitary portions formed to protrude upwardly and forwardly from said clamp means, and a fairing mounted on the outwardly extending portions of said rod members.

3,904,239

WIND DEFLECTOR FOR AUTOMOBILE WITH SLIDING ROOF

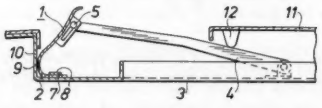
Hans Jardin, Krailling, Germany, assignor to Webasto-Werk W. Baier KG, Stockdorf, Munich, Germany

Filed Apr. 11, 1974, Ser. No. 460,055

Claims priority, application Germany, May 19, 1973, 2325594

Int. Cl.[2] B60J 7/22

U.S. Cl. 296—137 J **6 Claims**



1. In a sliding roof structure for automobiles in which a generally rectangular roof opening is surrounded by a roof frame that serves as a rain channel and as a support for a sliding roof mechanism, and in which said mechanism includes a rigid sliding roof panel which is openable through lowering of its rear edge and rearward retraction of the panel from the roof opening, a wind deflector assembly comprising in combination:

a wind deflector panel extending along the forward transverse edge of the roof opening, one edge of said panel being pivotably attached to the adjacent transverse rain channel portion of said roof frame by means of a bending hinge, thereby defining a horizontal transverse pivot axis around which the wind deflector panel is pivotable between a retracted position in which the panel is positioned below the roof level underneath the front portion of the sliding roof panel when the latter is closed, and an extended position in which the free edge of the wind deflector panel is positioned above the roof opening;

a lever connected to each lateral extremity of the wind deflector panel by a cam-and-follower connection and extending rearwardly to a pivot point on the lateral portion of the roof frame, the two levers being pivotable between an upper and a lower position, thereby moving the wind deflector panel between its extended and retracted positions, respectively, through the action of said cam-and-follower connection;

means for biasing the wind deflector panel toward its extended position; and

means defined by the sliding roof mechanism and by said levers for depressing the levers and retracting the wind deflector panel, when the sliding roof moves into its closed position; and wherein

said bending hinge is arranged to also fulfill, at least in part, the function of said biasing means.

3,904,240

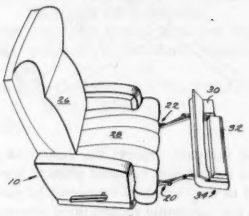
ROCKER RECLINER CHAIR

W. Clark Rogers, Jr., High Point, and Morton Snitzer, Rocky Mount, both of N.C., assignors to The Lane Company, Inc., Altavista, Va.

Continuation of Ser. No. 87,280, Nov. 5, 1970. This application Aug. 7, 1973, Ser. No. 386,405. The portion of the term of this patent subsequent to Jan. 11, 1991, has been disclaimed.

Int. Cl.[2] A47C 1/24

U.S. Cl. 297—85 **10 Claims**



1. In a rocker recliner chair having a base, a rocker cam unit rockably mounted on the base via rocker cams, a seat and arm frame unit mounted on the rocker cam unit, a chair back which can be reclined and erected, and a footrest which can be extended and retracted;

a lock mechanism mounted on the rocker cam unit for permitting rocking of the seat and arm frame unit, chair back, footrest and rocker cam frame on the base so long as the footrest is retracted and the chair back is erect and preventing rocking of the seat and arm frame unit, chair back, footrest and rocker cam frame when either of the following conditions exist: the footrest is extended and the chair back is reclined; the lock mechanism including a first lock element on the base and a second lock element on the seat and arm frame unit, one of said elements being pivotally mounted;

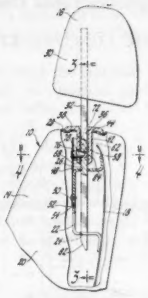
a link system pivotally interconnecting the footrest, the seat and arm frame unit, the back and the one of said lock element in an arc about a horizontal axis upon extension of the footrest and upon reclining of the chair back;

the other of the two described lock elements having means defining a cam surface placed to be engaged by the pivotally mounted lock element upon extension of the footrest and upon reclining of the chair back; the axis about which the pivotally mounted lock element pivots being so close to said cam surface on said other of the two described lock elements, that contact between the pivotally mounted lock element and said cam surface early in the pivoting of the pivotally mounted lock element, during initial chair back reclining or footrest extending movement, before the length of the pivotally mounted lock element between where the pivotally mounted lock element contacts said cam surface and said axis is erected as perpendicularly as it can become through further pivoting, and places the pivotally mounted lock element where it prevents downward tilting of the front of the rocker cam unit with respect to the base by a propping or holding action communicated between the base and the rocker cam unit and thus fully inhibits forward rockability of the rocker cam unit with respect to said base and further movement of said torque tube in either of said senses further erects said length of the pivotally mounted lock element and thus forces the rocker cam unit to rock backward on the base by a predetermined amount to bucket the chair occupant.

3,904,241
VEHICLE HEADREST

John P. Makinen, Royal Oak, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 21, 1974, Ser. No. 525,861
Int. Cl.² A47C 7/36
U.S. Cl. 297—391 3 Claims



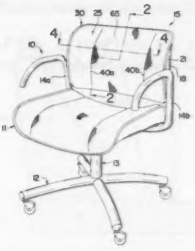
3. In a vehicle seat including a seat back having an opening, a headrest cushion having a support bar, a mounting bracket within the seat back for slidably receiving the support bar, and an escutcheon for surrounding the support bar and trimming the opening in the seat back, the improvement comprising: a leaf spring mounted on the mounting bracket, a latch pin mounted on the leaf spring and extending into the path of entry of the support bar, a cam surface on the end of the support bar engaging the latch pin and deflecting the leaf spring to carry the latch pin out of the path of entry of the support bar, the leaf spring having a pair of latch members integral therewith and spaced laterally each side of the support bar, the upper end of the pair of latch members being inclined to provide cam surfaces located in the path of entry of the escutcheon into the seat back, the escutcheon engaging the cam surfaces to deflect the leaf spring and thereby carry the pair of latch members thereof out of the path of entry of the escutcheon, the escutcheon having slots therein aligned with the latch members and into which the latch members are biased by the leaf spring to latch the escutcheon on the seat back.

3,904,242
CHAIR CONSTRUCTION AND METHOD FOR PRODUCING SAME

Earl H. Koepke, and Alan R. Reichard, both of Sturgis, Mich., assignors to Harter Corporation, Sturgis, Mich.

Filed Dec. 28, 1973, Ser. No. 429,051
Int. Cl.² A47C 7/02
U.S. Cl. 297—452 14 Claims

1. A chair having a frame, at least one portion adapted for removably receiving a cover, said assembly comprising; a mounting flange defining the perimeter of that portion of the seat frame adapted to receive the cover, a groove located adjacent said mounting flange and extending in substantially parallel relationship to said mounting flange, a bumper, said bumper having first and second opposed jaws conjoined to embrace said mounting flange, an anchor rib presented from one of said jaws and oriented to extend toward said second jaw, said anchor rib being releasably received within said

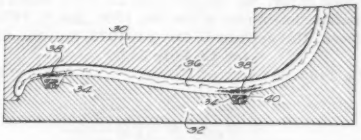


groove, a cover, and means to secure said cover to one of said jaws.

3,904,243
FIBERGLASS SHELL CONSTRUCTION WITH SCREW ANCHOR INSERTS

George A. Kostelec, and Richard J. Resch, both of Green Bay, Wis., assignors to Krueger Metal Products, Inc., Green Bay, Wis.

Filed Sept. 23, 1974, Ser. No. 508,123
Int. Cl.² A47C 5/12
U.S. Cl. 297—457 4 Claims



1. In a molded fiberglass seat shell construction having a seat portion with a lower surface the improvement comprising a plurality of protrusions on the lower surface of said seat shell, each of said protrusions including cavity fastening elements having an exposed first portion and a second portion confined in said cavities, said fastening elements having a shank portion and upper and lower laterally-extending flanges, said shank portion and said upper flange comprising said second portion confined in said cavity and said lower flange comprising said second portion, and wherein said protrusion and said lower flange have complementary tapered surfaces which decrease in radius toward the lower surface of said lower flange, and an aperture in said fastening elements for receiving screws, and wherein said shank portion has angularly related surfaces to prevent rotation of said fastening elements in said cavities.

3,904,244
METHOD AND APPARATUS FOR MECHANIZED SEAM MINING

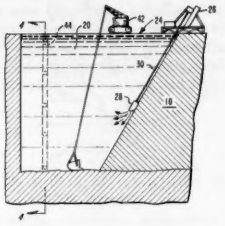
John C. Haspert, 895 Coronado, Arcadia, Calif. 91006

Division of Ser. No. 219,218, Jan. 20, 1972, and a continuation-in-part of Ser. No. 873,344, Nov. 3, 1969. This application Aug. 20, 1973, Ser. No. 390,021
Int. Cl. E21c 27/34
U.S. Cl. 299—34 9 Claims

1. Apparatus for conducting a seam mining operation controlled from above the point where ore is being robbed, comprising:

a broaching tool adapted for reciprocating movement up and down a sloped surface formed within the seam;

an elongated rigid member having some bending flexibility, extending from above the seam above and generally parallel to said sloped surface, the lower end of said member being attached to the upwardly disposed end of said broaching tool;



drive means coupled to the upper end of said member and operable for drivingly reciprocating and progressively advancing said member in a longitudinal direction to thereby reciprocate said broaching tool and rob ore from said sloped surface; and

a removable parasite weight load carried by said broaching tool.

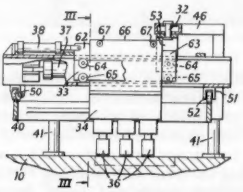
3,904,245
MACHINE FOR CUTTING RECESS IN CONCRETE BY IMPACT

Ronald A. W. Clarke, Horsham, England, assignor to Klarcrete, Limited, Great Britain

Division of Ser. No. 191,857, Oct. 27, 1971, which is a continuation-in-part of Ser. No. 1700, Jan. 9, 1970, abandoned. This application Oct. 11, 1973, Ser. No. 405,470

Int. Cl. E01c *23/09*

U.S. Cl. 299—37 **7 Claims**



1. A machine for cutting a recess of a predetermined size and contour in the top surface of a concrete road, comprising a main frame adapted to be mounted on the road to be cut, said frame having means defining a first track thereon, a first carriage movable along said first track, said first carriage having means defining a second track thereon extending in a different direction from that of the first track, a second carriage movable along said second track, a power driver hammer unit coupled to the second carriage for movement therewith and having cutting means adapted to engage the road surface, the hammer unit being operable to impart through the cutting means a succession of impact blows to the road, first drive means operable to reciprocate the first carriage along said first track, stop means restricting movement of the first carriage along said first track to a distance corresponding to one dimension of the desired recess, second drive means operable to reciprocate the second carriage along said second track, further stop means restricting movement of the second carriage along said second track to a distance corresponding to another dimension of the desired recess, and control means adapted to regulate operation of the first and second drive means automatically in a plurality of successive cycles, in each of which the carriages reciprocate in a predetermined sequence arranged to cause the cutting means to traverse over the total area defined by the range of movement of the two carriages determined by said stop means.

3,904,246
ROTARY CUTTER HEADS FOR MINERAL MINING MACHINES

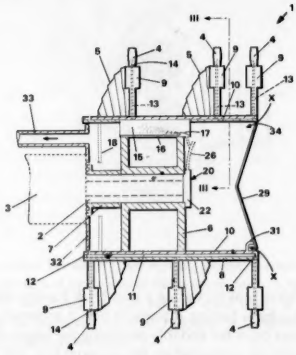
John Albert Gandy, Bircoats near Doncaster, and Albert Graham French, Willington, both of England, assignors to Coal Industry (Patents) Limited, England

Filed Feb. 6, 1974, Ser. No. 440,010

Claims priority, application United Kingdom, Feb. 9, 1973, 06437/73

Int. Cl.² E21C *13/04, 7/00;* **E21B** *21/00*

U.S. Cl. 299—81 **15 Claims**



1. A rotary cutter head for a mineral mining machine having a drive shaft extending towards the working mineral face, comprising a hub assembly drivably mountable on the said drive shaft of the machine, a cylindrical component secured around the hub assembly, a plurality of cutter tool holders provided around the periphery of the cutter head, and ventilating means remote from the axis of rotation of the cutter head and including air flow guide means and air flow inducing nozzle means for directing fluid along the said air flow guide means.

3,904,247
BIT ASSEMBLY

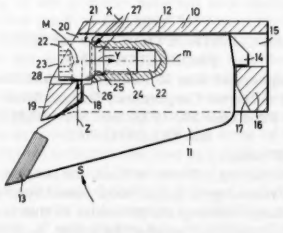
Berthold Ostrop, Werne, Germany, assignor to Gewerkschaft Eisenhutte Westfalia, Westphalia, Germany

Filed Sept. 24, 1973, Ser. No. 400,412

Claims priority, application Germany, Sept. 14, 1973, 2244977

Int. Cl.² E21C *15/00*

U.S. Cl. 299—91 **4 Claims**



1. A bit assembly comprising:

a. a hollow bit holder having top and bottom walls, side walls and end walls, one of said end walls having an aperture therein communicating with the hollow interior of said

holder, said bottom wall having an opening therein communicating with the hollow interior of said holder;

b. said one end wall having a shoulder formed thereon along the lower periphery of the end wall aperture;

c. an interior support member formed on the bit holder walls on the opposite side of the hollow interior of said holder from said shoulder;

d. a tool bit having a root portion inserted through the bottom wall opening into the hollow interior of said bit holder, said root portion having retaining means thereon for interacting with said bit holder support member, said root portion having an internally threaded bore which is axially aligned with the end wall aperture, said bore having its opening countersunk; and

e. a screw inserted through the end wall aperture and screwed into the bore of said root portion, said screw having a head bearing against and being supported by said one end wall shoulder, said screw having a frusto-conical surface formed between its head and threaded shank bearing against said countersunk bore opening;

f. said one end wall shoulder, said screw head, said countersunk bore opening, and said frusto-conical screw surface all being arranged relative to each other whereby forces transmitted to said screw head intersect at a point on the axis of said screw.

3,904,248

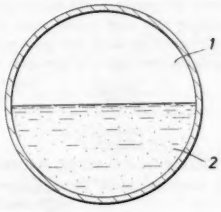
PROCEDURES FOR RESTART AND SHUTDOWN OF SLURRY PIPELINES

Robert A. Cochran, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jan. 6, 1972, Ser. No. 215,856

Int. Cl. B65g *53/04, 53/30*

U.S. Cl. 302—66 **9 Claims**



1. A method for shutting down a slurry pipeline having valley sections and avoiding settled bed plugs in the valley sections, the slurry comprising a liquid phase and a solid phase and said method comprising the step of:

gradually slowing the flow in the slurry pipeline so that the settled bed which forms is uniformly distributed along the entire length of the pipeline wherein flow shutdown time ranges from about

$$\frac{D}{V_s}\left(\frac{C_b - C_s}{C_s}\right) \text{ to about } 10\,\frac{D}{V_s}\left(\frac{C_b - C_s}{C_s}\right)$$

where D is the pipeline diameter, V_s is the slurry settling velocity at the pipeline slurry solid volume concentration, C_s is the slurry solid volume concentration, and C_b is the slurry settled bed solid volume concentration.

3,904,249

REMOTE CONTROL BRAKING APPARATUS INCLUDING JERK CONTROL

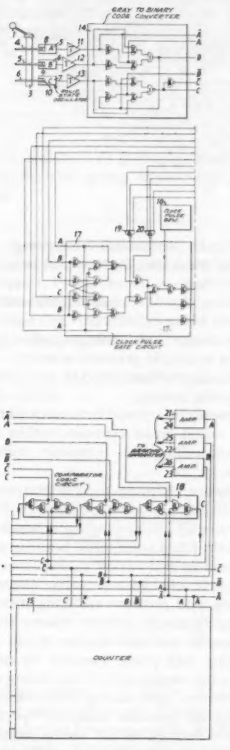
Kenneth Desmond Eddington Crawford, London, England, assignor to Westinghouse Brake and Signal Co., London, England

Filed Mar. 6, 1972, Ser. No. 231,923

Claims priority, application United Kingdom, Mar. 23, 1971, 7552/71

Int. Cl. B60t *7/10*

U.S. Cl. 303—20 **6 Claims**

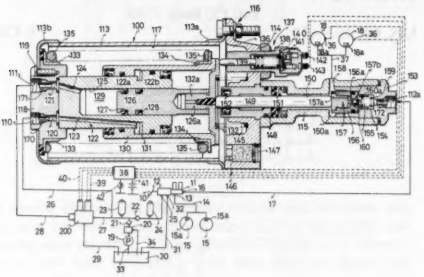


1. A remote vehicle control apparatus including a brake control device having control means which is settable to a range of conditions according to the desired braking effect said means being linked to a plurality of signal couplers which according to the selected position are rendered effective or ineffective to couple electrical signals to discrete combinations of a plurality of signal channels in accordance with a code by which the signal in only one said channel occurs at each transition during progressive movement of the control means in one direction or the other to increase or reduce the braking, and a plurality of output leads for providing a binary coded output, jerk control means connected between said output leads and binary coded braking means and comprising a binary coded counter, an electrical pulse generator and a comparator circuit for comparing the said binary coded output with a binary coded output of the binary counter and in response to non-conformity there between enabling pulses to be gated from the pulse generator to the counter to reduce the non-conformity, the counter having a plurality of outputs for providing a binary coded output connected to said binary coded braking means for controlling the brakes of a vehicle.

3,904,250
ANTI-SKID BRAKE MECHANISM

Toshihiyuki Kondo, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Filed May 4, 1973, Ser. No. 357,169
Claims priority, application Japan, May 5, 1972, 47-44426
Int. Cl. B60t *8/00*
U.S. Cl. 303—21 F **6 Claims**



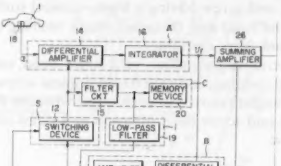
1. An anti-skid brake mechanism comprising:
a master cylinder generating hydraulic pressure;
wheel brake cylinders;
a hydraulic braking circuit connecting said master cylinder with said wheel brake cylinders;
means for generating a skid sensing signal;
a pump powered hydraulic pressure source;
a reservior hydraulically connected to said pump powered hydraulic pressure source;
a cut-off valve means interposed between said master cylinder and said wheel brake cylinders within said braking circuit for controlling the hydraulic communication therebetween;
a hydraulic pressure reducing means interposed between said cut-off valve means and wheel brake cylinders within said braking circuit and including a housing, a piston member slidably fitted within said housing and cooperatively connected to said cut-off valve means;
an electro-magnetic change-over valve means selectively communicating said pressure reducing means with said pump powered hydraulic pressure source and said reservoir in response to said skid sensing signal; and
means for biasing said piston member of said hydraulic pressure reducing means against the sliding resistance of said piston member, said biasing means being capable of freely assisting the pressure reducing operation of said piston member through its full stroke extent and especially at an approximately final stage thereof, where the hydraulic pressure in said wheel brake cylinders has been considerably decreased under a skid braking operation.

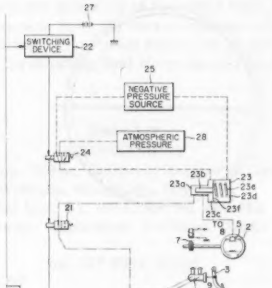
3,904,251
AUTOMATIC SKID REDUCTION CONTROL METHOD AND DEVICE FOR A BRAKING SYSTEM

Ryotaro Hikida; Yasutaka Hayashi; Hideo Arakawa, and Takahiko Mori, all of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed May 14, 1973, Ser. No. 359,623
Claims priority, application Japan, May 15, 1972, 47-47849
Int. Cl.[2] B60T *8/10;* **188** *181 C*
U.S. Cl. 303—21 BE **12 Claims**

1. A method for automatically controlling the application of braking forces to wheels of a moving vehicle through a brake, comprising the steps of:
detecting an acceleration of a moving vehicle,
detecting a wheel speed of said moving vehicle,
computing a vehicle velocity by integrating said detected acceleration with an integrator means,
comparing said computed vehicle velocity and said detected wheel velocity,
generating an electrical signal indicating the difference between said vehicle velocity and said wheel velocity,
feeding back said electrical signal indicating the difference between said vehicle velocity and said wheel velocity to said integrator means and to a memory means through a first switching means thereby maintaining said vehicle velocity equal to said difference and storing said wheel velocity signal whenever the brake is not applied,
opening said first switching means in response to application of the brake, and feeding back said difference signal which is stored in said memory means immediately before the application of the brake to the integrator means thereby cancelling the drafts, noises, and effects of gravitational acceleration normally encountered during the acceleration detecting step when said moving vehicle is travelling on an inclined road,
auxiliarily feeding back said electrical difference signal to said integrator when the brake is gently applied for a long time, thereby compensating the error introduced in the mathematical operation of integration,
computing whether a slip ratio of said wheel velocity to said vehicle velocity is larger than a predetermined value,
decreasing the braking force to a reduced operating level in response to a slip ratio larger than said predetermined value, and resetting the braking force to a normal operation level in response to a slip ratio smaller than said





predetermined value.

3. A device for automatically controlling the application of braking forces to the wheels of a moving vehicle through a brake device, comprising

acceleration detecting means for detecting an acceleration of a moving vehicle,

wheel velocity detecting means for detecting a wheel speed of said moving vehicle,

means for integrating said detected acceleration, means for comparing said computed vehicle velocity and said detected wheel velocity and for generating an electrical signal indicating the difference between said vehicle velocity and said wheel velocity, memory means for storing electrical signals connected to said integrating means, means for feeding back said difference signal to said integrating means and to said memory means, comprising a first switching means for connecting the electrical difference signal to the integrating means and to the memory means in response to the absence of application of brake pressure and for disconnecting the connection between the comparing means and the integrating means in response to the application of the brake,

said memory means thereby storing said difference signal between said vehicle velocity and said wheel velocity fed back immediately before the application of the brake, and applying said stored difference signal to the integrating means during the application of the brake,

thereby cancelling the drifts, noises and the effects of gravitational acceleration on said acceleration detecting means when said moving vehicle is travelling on an inclined road,

auxiliary feedback means for applying an electrical signal in response to the difference between said vehicle velocity and said wheel velocity on the sustained gentle application of the brake thereby compensating the error introduced in the mathematical operation of integration by said integrating means when the brake is gently applied for a long time,

computing means for determining whether a slip ratio of said wheel velocity to said vehicle velocity is larger than a predetermined value, and

controlling means for reducing the brake force in response to a slip ratio larger than said predetermined value, and for reapplying the braking force at a normal operating level in response to a slip ratio smaller than said predetermined value.

3,904,252

VEHICLE HYDRAULIC BRAKE SYSTEMS

Ricardo Franzi, Turin, Italy, assignor to Fiat Societa per Azioni, Turin, Italy

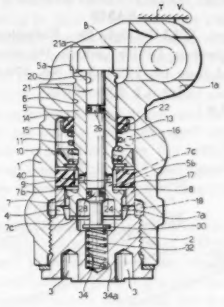
Filed June 28, 1974, Ser. No. 484,034

Claims priority, application Italy, Nov. 30, 1973, 70511/73

Int. Cl.[2] B60T *8/22*

U.S. Cl. 303—22 R **3 Claims**

1. In a vehicle hydraulic brake system having a brake pressure regulator provided in a hydraulic line between a source of fluid under pressure and wheel brake means and elastic means connected to the chassis of the vehicle for applying a force to said brake pressure regulator to control the hydraulic pressure to the wheel brake means in dependence upon changes of vehicle load, the improvement in said regulator comprising a housing defining a cylinder having an intake port connected to said pressure source and a delivery port connected to the brake means, first piston means slidably disposed in said cylinder in operative engagement with said elastic means, first valve means operable by said first piston means located in said cylinder between said intake port and said delivery port to reduce the hydraulic pressure between said ports, said first piston means having a coaxial cylindrical bore, second piston means slidably disposed in said bore in operative engagement with said elastic means, spring means in said housing biasing said second piston means into engagement with said elastic means and second valve means operable by said second piston means for directly connecting said intake port and said delivery port upon shifting of said second piston means by said spring means upon breakage of said elastic means.



3,904,253

BRAKING REGULATOR

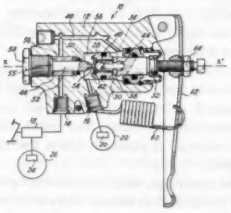
Christian Riquart, Paris, France, assignor to The Bendix Corporation, South Bend, Ind.

Filed Oct. 15, 1974, Ser. No. 514,345

Claims priority, application France, Oct. 18, 1973, 73.37155

Int. Cl.[2] B60T *8/22*

U.S. Cl. 303—22 R **6 Claims**



1. In a braking system of a vehicle comprising a hydraulic pressure source and at least a set of brake actuators, a braking regulator for insertion between said hydraulic pressure source and said set of brake actuators, said regulator comprising:

a housing with a stepped bore therein;

a differential piston slidably mounted in said housing and defining therewith a first and a second pressure chamber; said first pressure chamber being adjacent to the piston face having the larger effective cross section and being connected to the set of brake actuators;

a passage provided in the piston for communicating said first and said second pressure chambers;

valve means mounted in said passage and resiliently urged to bear in a fluid tight manner on a seat provided on said piston;

resilient return means for continually urging said piston towards said second pressure chamber;

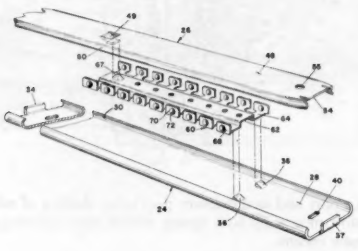
abutting means situated in said second pressure chamber for disengaging said valve means off their seat upon movement of said piston towards said second pressure chamber, said abutting means being movable relative to the housing and being subjected to the opposite actions of the pressures in the first and second chambers for controlling the communication of the pressure source from the first pressure chamber to the second pressure chamber.

3,904,254

MEANS FOR POSITIONING BALL RETAINER FOR TELESCOPING BALL BEARING SLIDE MECHANISMS IN RELATIONSHIP TO OPEN OR CLOSED POSITION OF SAME

Magnus F. Hagen, 3713 Twilight Dr., Fullerton, Calif. 92632, and Fred A. Jordan, 14906 Lodosa, Whittier, Calif. 90605

Filed June 14, 1973, Ser. No. 370,040
Int. Cl. F16c *17/00*
U.S. Cl. 308—3.8 7 Claims



1. Means for recycling of ball retainers to effectively eliminate harmful ball creepage for telescoping ball bearing slide mechanisms, comprising:

an outer slide member of generally channel shape and having a longitudinally extending bottom wall and oppositely arranged ball races along the side edges of the bottom wall, said ball races being concave in cross-section and facing each other;

an inner channel shaped slide member having a bottom longitudinally extending between wall and oppositely facing ball races along the side edges thereof, said ball races being concave in cross-section and facing outwardly, the inner slide member operably disposed within the other slide member;

a ball retainer having a longitudinally extending bottom wall, and side parts having openings for balls in longitudinally spaced relationship, said ball retainer being disposed between the outer and inner slide members and having a normal 0 position when the slide members are telescoped;

balls in said openings, said balls being operably disposed in the ball races and retained therein by said ball retainer;

a stop for the outer slide member adjacent one end thereof; a stop for the inner slide member adjacent one end for engagement with the stop of the outer slide member to limit telescoping movement of the slide members;

ball retainer stop means for the outer slide member adjacent the first mentioned stop thereof for limiting movement of the ball retainer to a normal 0 position when the slide mechanism is telescoped;

a fixed recycle tab for the inner slide member; and

a fixed counter tab for the ball retainer engagable by the recycle tab of the slide inner member for positively moving the ball retainer to the normal zero position when the slide members are telescoped.

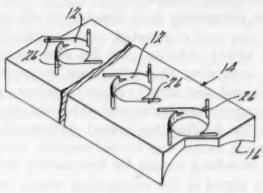
3,904,255

VORTEX DIFFUSER FLUID BEARING DEVICE

John W. Neumann, Birmingham, Mich., and Harry A. Mackie, Raleigh, N.C., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Division of Ser. No. 125,251, March 17, 1971, Pat. No. 3,782,791. This application Feb. 20, 1973, Ser. No. 333,873
Int. Cl. F16c *17/00*
U.S. Cl. 308—5 R 7 Claims

1. A vortex diffuser fluid bearing conveyor device for moveably supporting a body thereon comprising a three-dimensional member having one surface formed with a plurality of cavities extending longitudinally therealong each cavity extending inwardly of said one surface, supply means disposed in communication with each said cavity for supplying a fluid thereto in a manner to cause said fluid to travel in a helical direction about the axis of each said cavity in the form of a vortex and outwardly beyond said one surface of said member and across the surface of a body adapted to be disposed adja-



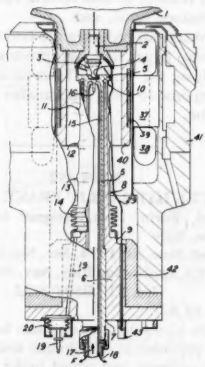
cent thereto and positioned substantially outside of the openings of said cavities in noninterferring translatory relationship with respect to said member and separated from said one surface on a cushion of said fluid, said fluid discharged from said cavities outwardly between said one surface and the adjacent surface of a body in a manner to simultaneously apply an attractive and a separating force to such body.

3,904,256

SUPPORTING PIVOT SYSTEM FOR A CENTRIFUGE BOWL

Hans Pfeifer, L'Isle Adam, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed June 21, 1973, Ser. No. 372,238
Claims priority, application France, June 29, 1972, 72.23529
Int. Cl. F16c *32/00*
U.S. Cl. 308—159 10 Claims



1. A supporting pivot system for a centrifuge bowl of the type comprising in known manner a step bearing in which the male portion or pivot is secured directly to the bottom portion of the bowl and in which the female portion rests on elastic damping means, wherein said elastic damping means essentially comprise:

a hollow elastic shaft having a cylindrical shape and terminating at the top end in a lifting-oil reservoir chamber, the spherical female cup of the step bearing being formed as a recess in the bottom of said chamber,

a damping support of hollow construction which surrounds the hollow shaft and is of slightly conical shape, said shaft being inserted into the lower end of said support,

a casing of substantially cylindrical shape which is secured to the base of the support and to the top end of the elastic shaft so as to enclose the shaft-support assembly in leak-tight manner and to form on the one hand between said shaft and said support and on the other hand between said support and said casing a closed space filled with damping oil having low variation of viscosity,

means provided in the hollow central portion of the elastic shaft for ensuring laminar flow of a cooling fluid.

3,904,257

PLAIN BEARINGS

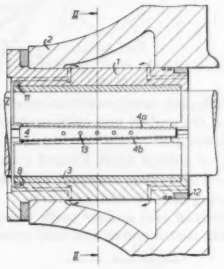
Colin Wray Herbert, Tees-Side, England, assignor to The Glacier Metal Company Limited, Wembley, England

Filed Feb. 11, 1974, Ser. No. 441,220

Claims priority, application United Kingdom, Feb. 16, 1973, 7651/73

Int. Cl.² F16C *23/00*

U.S. Cl. 308—237 R **7 Claims**



1. A journal bearing suitable for a ship's propellor, comprising a housing, at least one part-cylindrical shell defining a bearing surface for the shaft, and separable from the housing, and keying means holding the shells located in the housing and capable of movement to release the shells to enable them to be withdrawn from the housing and shaft, said keying means comprising at least one elongate bar capable of being slid axially in relation to the edge of a shell to force the shell against the housing, and capable of axial withdrawal to release the shell.

3,904,258

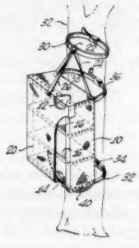
COLLAPSIBLE CAMPERS CUPBOARD

Jack H. Faulkenberry, 888 Killer Canyon Rd., Paso Robles, Calif. 93446

Filed Feb. 11, 1974, Ser. No. 441,286

Int. Cl.² A47B *43/00*

U.S. Cl. 312—6 **2 Claims**



1. In combination:

a collapsible body of flexible material having side, back, top and bottom panels;

a plurality of spaced rigid shelves within said body, said body being secured to said shelves, the top and bottom shelves being in face to face contact with the respective top and bottom panels of said body;

suspension means including first and second straps, said first strap being secured at its ends to the end portions adjacent the back edge of said top panel and top shelf, said second strap being secured at one end to the center of the front edge portions of said top panel and top shelf;

a ring slidable on said first strap, the remaining end of said second strap being secured to said ring;

a belt slidably threaded through said ring of sufficient length to encircle a tree trunk;

and a pair of stabilizing straps secured respectively to the end portions of said bottom panel and bottom shelf,

and including a collapsible cover flap secured at one end to said top panel, said flop having a skirt to matingly fit said side and bottom panels when said unit is suspended in use and wrappable around said unit when collapsed to enclose it for storage.

3,904,259

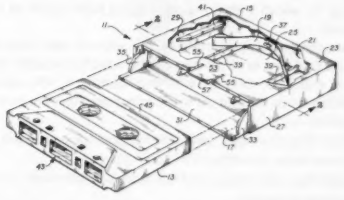
MAGNETIC TAPE CASSETTE STORAGE CONTAINERS

William F. Hoffmann, and Walter A. Blissell, Jr., both of Seattle, Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Feb. 22, 1974, Ser. No. 444,910

Int. Cl.² E05B *73/00;* **B65D** *39/00*

U.S. Cl. 312—111 **47 Claims**



1. A magnetic tape cassette storage container for storing magnetic tape cassettes comprising:

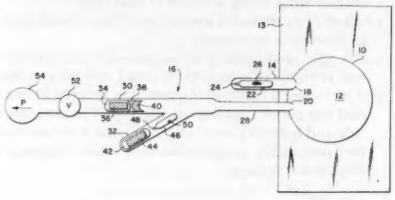
a container housing at least one compartment defined by a solid top wall, a solid bottom wall, two solid end walls and a solid back wall, and having an open front wall, said top and bottom walls being spaced from one another by an amount slightly greater than the thickness of a tape cassette and said end walls being spaced from one another by an amount slightly greater than the width of a tape cassette, and said back wall being spaced from said open front by an amount slightly greater than the depth of a tape cassette;

compressible ejection means mounted in said at least one compartment for directing a magnetic tape cassette held in said one compartment toward said open front wall; and at least one solid door rotatably affixed to said container, adjacent to said open front wall of said at least one compartment, so as to be movable between an open position and a closed position, when in said open position, said at least one door allowing access to said at least one compartment such that a magnetic tape cassette can be inserted into said at least one compartment, when in said closed position, said at least one door closing said front wall of said compartment so as to press any cassette within said at least one compartment against said compressible ejection means and thereby compresses said ejection means, said container and said at least one door being formed such that said at least one compartment is entirely enclosed when said at least one door is in said closed position.

3,904,260
METHOD FOR PRODUCING MAGNETIC RESONANCE CELLS

Donald I. Shernoff, White Plains, and James H. Simpson, Katonah, both of N.Y., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 381,834, July 23, 1973, Pat. No. 3,860,311. This application July 16, 1974, Ser. No. 489,002
Int. Cl.[2] H01J *9/385*
U.S. Cl. 316—20 **6 Claims**



1. A method of making a magnetic resonance cell out of a glass sphere comprising the steps of:

placing an ampoule, having a frangible tip and containing gettering material, inside a first tube having an open end; placing a second ampoule containing wax inside a second tube open at both ends;

placing a third ampoule having a frangible tip and containing an alkali metal inside a third tube open at only one end;

connecting the open ends of the second and third tubes to one end of a necked-down tube which is smaller in diameter than the two to which it connects, the connection being made so that all three tubes communicate with each other;

connecting the open ends of the first tube and the necked-down tube to orifices in said sphere;

connecting the open end of said second tube to vacuum pumping means;

placing said sphere inside an oven;

evacuating the system of tubes and sphere;

heating said sphere to remove gases from the walls and then allowing the sphere to cool;

moving said ampoule containing the wax inside the necked-down tube to a position near the sphere;

heating the sphere to a temperature sufficient to melt the wax without degrading it so that the wax coats the inside of the sphere;

removing the sphere and tubes from the oven;

moving said wax-containing ampoule back and out of said necked-down tube;

moving said alkali-metal-containing ampoule into said necked-down tube;

heating the necked-down tube at the end away from the end communicating with the sphere to seal it off and breaking off the second and third tubes therefrom after the seal; and

breaking the frangible tips of the remaining ampoules.

3,904,261
ELECTRICAL CABLE CONNECTOR

Frank E. Cooney, Manhattan Beach, Calif., assignor to NCR Corporation, Dayton, Ohio

Filed May 10, 1971, Ser. No. 141,737
Int. Cl.[2] H01R *3/06, 13/58;* **H05K** *1/02*
U.S. Cl. 339—17 F **2 Claims**

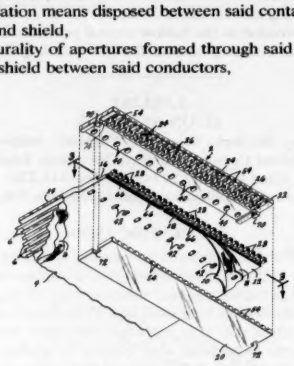
1. An assembly for connecting conductors enclosed in the insulating matrix of a flat cable to an electrical circuit component, wherein a ground shield extends parallel to said conductors substantially co-extensive with said matrix and said conductors, comprising:

a. a connector housing comprising a nest member and a cover member,

b. a contact crimped onto a free end of at least one of said conductors,

c. insulation means disposed between said contact and said ground shield,

d. a plurality of apertures formed through said matrix and said shield between said conductors,



e. said nest member and cover member sandwiching said contact and the end of said cable to which it is attached between them, and

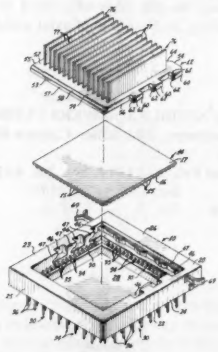
f. a plurality of anchor teeth formed on one of said next member and said cover member and extending through corresponding ones of said apertures,

g. the free ends of said anchor teeth being bonded to the other of said nest member and said cover member.

3,904,262
CONNECTOR FOR LEADLESS INTEGRATED CIRCUIT PACKAGES

John M. Cutchaw, 7333 E. Virginia, Scottsdale, Ariz. 85257

Filed Sept. 27, 1974, Ser. No. 509,855
Int. Cl.[2] H05K *1/00;* **H01R** *13/54*
U.S. Cl. 339—17 CF **11 Claims**



1. A connector for removably mounting a leadless circuit package on a backpanel and electrically coupling the terminal pads of the leadless circuit package to the backpanel, said connector comprising:

a. a housing for mounting on the backpanel, said housing having a pair of upstanding end walls and a pair of upstanding side walls which form the perimeter of an up-

wardly opening chamber formed therein into which the leadless circuit is nestingly positionable;

b. a cover demountably nestingly positioned within the chamber of said housing atop the leadless circuit package when that package is positioned therein, said cover laterally slidably movable relative to said housing;

c. deflecting and locking means formed in said housing and disposed in the path of sliding movement for deflecting said cover downwardly in the chamber of said housing when said cover is slidably moved into engagement therewith and for locking said cover in the deflecting position; and

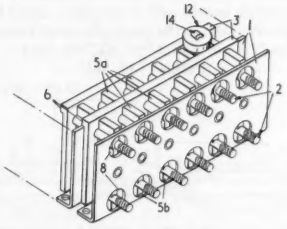
d. electrical interconnecting means mounted in said housing and extending into the chamber of said housing for engagement with the terminal pads of the leadless circuit package when that package is positioned therein, said electrical interconnecting means extending from said housing for engaging the backpanel when said housing is mounted thereon.

3,904,263

MULTI-SOCKET CONNECTION BOARDS AND CONTACT PINS THEREFOR

John Phillip Norman, 41 Trumpinton Rd., Forest Gate, London E.7, England

Filed Mar. 8, 1973, Ser. No. 339,202
Int. Cl. H01r *9/00*
U.S. Cl. 339—18 C **11 Claims**



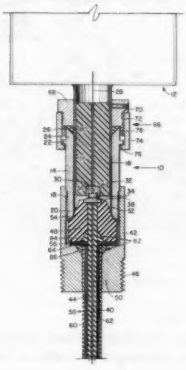
1. A multi-socket assembly comprising a stack of laminar first fixed contact elements, each having length and width dimensions significantly greater than the thickness dimension and defining a plate with a major plane lying within said length and width dimension and with the major planes of each first fixed contact element being disposed generally parallel, one to another, insulating members interposed between adjacent stacked first fixed contact elements, a plurality of second fixed contact elements each extending through the stack of first fixed contact elements and interposed insulating members and extending in a direction perpendicular to the major planes of said stack of first fixed contact elements, each insulating member between two adjacent first fixed contact elements being adapted to insulate them from each other and being further adapted to insulate the first fixed contact elements from the second fixed contact elements, the insulating members each defining a plurality of sockets each adapted to receive a contact pin in one or other of two orientations to connect a first fixed contact element to one or other of two second fixed contact elements depending on the orientation of the inserted pin, said first fixed contact elements each comprising a plate with a row of contacts extending away from the plate towards the adjacent insulating member, and an aperture on either side of each contact, said apertures forming two rows extending parallel to the row of contacts, and said second fixed contact elements extending through the aligned apertures.

3,904,264

ELECTRICAL CONNECTOR

Donald H. Oertle, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Mar. 4, 1974, Ser. No. 448,142
Int. Cl.² H01R *7/02*
U.S. Cl. 339—94 C **9 Claims**



1. An improved connector for sealing both the assembled components of an electrical connector and the assembled connector with a utilization apparatus wherein said connector includes;

a. a tubular housing;

b. a cylindrical insulation means axially positioned inside said tubular housing;

c. a conduction means positioned through said cylindrical insulation means;

d. a cap means releasably attached to a first end of said tubular housing;

e. means for positioning an insulated conductor through said cap means and in electrical contact with said conduction means;

f. means for retaining said conductor in said cap means; and,

g. attaching means for attaching a second end of said tubular housing to said utilization apparatus, said attaching means including a passageway between said attaching means and said second end; the improvement comprising:

h. a first wedge-shaped ring seal means positioned in said passageway between said second end of said tubular housing and said means for attaching said second end of said tubular housing to said utilization apparatus;

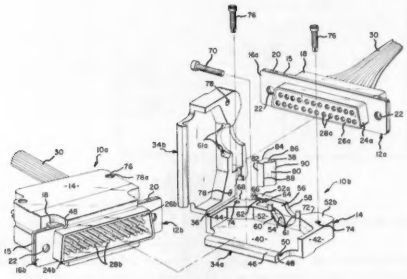
i. a second wedge-shaped ring seal means positioned around said insulated conductor; and,

j. said means for positioning a conductor means through said cap means and in electrical contact with said insulated conductor comprising a cylindrical insulating portion having a tapered section on one end which wedgingly seals said tubular housing.

3,904,265
ELECTRICAL CONNECTOR SHIELD HAVING AN INTERNAL CABLE CLAMP

Robert David Hollyday, Hershey, and Paul Francis Schofield, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 228,654, Feb. 23, 1972, abandoned. This application Feb. 28, 1974, Ser. No. 446,988
Int. Cl.[2] H01R *13/58*
U.S. Cl. 339—103 M **1 Claim**



1. An electrical connector shield adapted to contain an electrical connector having a plurality of electrical leads attached to the back thereof, which comprises:

a. an insulating housing consisting of two hinged halves, having,

a front portion adapted to receive an electrical connector having a plurality of electrical leads attached to the back thereof; a rear portion having a channel thru which said electrical leads may pass, said channel defined by a generally straight wall on one side and on the opposite side a wall consisting of a straight section and a curved section, the curved section being positioned adjacent an outside wall of the housing, and

a slot in said rear portion and opening into said channel from the generally straight wall;

b. a movable clamp deflector slidably mounted in said slot, said deflector having a beveled side which when facing inwardly toward the front portions force electrical leads which may pass thru the channel to leave the shield in a direction generally parallel to the curved section and when the beveled side faces outwardly, electrical leads which may pass thru the channel would be forced to leave the shield in a direction generally parallel to the longitudinal axis of the shield; and

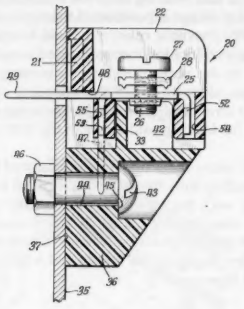
c. means for advancing or withdrawing said clamp deflector into or out of said channel.

3,904,266
TERMINAL STRIP

Don W. Fitzpatrick, Naperville, Ill., assignor to Reed Devices, Inc., Glen Ellyn, Ill.

Filed Aug. 16, 1974, Ser. No. 498,031
Int. Cl.[2] H01R *9/16, 9/22*
U.S. Cl. 339—198 R **4 Claims**

1. A terminal strip comprising: a base for supporting at least one electrical terminal insert means, said base comprising two perpendicular feed-through apertures therein, said terminal insert means comprising a pin selectively insertable through each one of said apertures for engagement with a terminal

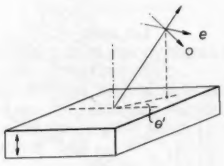


strip supporting surface to effect dualposition mounting of said base to said surface.

3,904,267
COMPENSATING PLATE TO PROVIDE UNIFORMITY IN INTERFERENCE MICROSCOPES

Johannes D. de Veer, Harvard, Mass., assignor to American Optical Corporation, Southbridge, Mass.

Filed July 2, 1973, Ser. No. 376,074
Int. Cl.[2] G02B *21/06*
U.S. Cl. 350—12 **5 Claims**

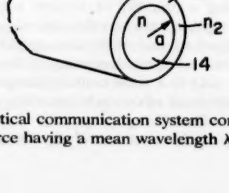


1. In a differential interference contrast microscope having at least one birefringent element, the improvement comprising a compensating plate comprising a birefringent material having an optic axis substantially parallel to the optical axis of the instrument, said compensating plate having a thickness effective to correct phase variations in the microscope field.

3,904,268
OPTICAL WAVEGUIDE HAVING OPTIMAL INDEX GRADIENT

Donald B. Keck, Big Flats, and Robert Olshansky, Painted Post, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Nov. 15, 1974, Ser. No. 524,074
Int. Cl.[2] G02B *5/14*
U.S. Cl. 350—96 WG **6 Claims**



1. In an optical communication system comprising a light source having a mean wavelength λ,

a multimode optical waveguide having input and output ends, said input end being disposed in light receiving relationship with respect to said source, and

means responsive to light radiating from the output end of said waveguide,

said optical waveguide being characterized in that it comprises a transparent core having a radius a and an on-axis refractive index n_1, and

a layer of cladding material surrounding said core, the refractive index of said layer being less than n_1,

the refractive index $n(r)$ of said core varying as a function of the radial distance r from the center of said core substantially as

$$n(r) = n_1[1 - 2\Delta(r/a)^{\alpha}]^{1/2} \text{ for } r \leq a$$

where α lies outside the range from 2 to $(2 - 2\Delta)$ and is determined by the equation

$$\alpha = 2 + y - \frac{\Delta(4+y)(3+y)}{(5+2y)}$$

where

$$y = -\frac{2n_1}{N_1}\frac{\lambda d\Delta/d\lambda}{\Delta}$$

$\Delta = (n_1^2 - n_2^2)/2n_1^2$

$N_1 = n_1 - \lambda dn_1/d\lambda$

and n_2 is the refractive index of said core at $r = a$.

3,904,269

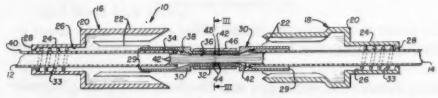
FIBER OPTIC CABLE CONNECTOR

Robert L. Lebduska, La Mesa, and Gary M. Holma, San Diego, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 28, 1974, Ser. No. 437,428

Int. Cl.² G02B *5/16*

U.S. Cl. 350—96 C **2 Claims**



1. A quick-disconnect connector having identical halves for coupling two optical cables in axial alignment, each cable including a plurality of individual fibers having bared ends comprising:

an identical terminal for each cable having a bored opening extending therethrough for receiving at an inner end the bared fiber ends of each respective cable, which fiber ends terminate at an outer end of the terminal, said terminal having a tapered bore portion for compacting the terminated fiber ends;

potting means for securing the cable fibers within their respective tapered bored portions;

an intermediate sleeve for receiving and for aligning the outer ends of the terminals with the bared ends of the respective cables in face-to-face relation;

an identical outer ferrule for housing each terminal and having an internal shoulder;

each terminal being slidably mounted longitudinally within its respective ferrule after the connector halves are coupled together;

identical coiled compression springs disposed longitudinally between each of the shoulders of said outer ferrules and the ends of their respective terminals;

each of said outer ferrules having a plurality of identical, circumferentially spaced resilient fingers extending longitudinally the cables, the fingers of one ferrule longitudinally slidable between the fingers of the other ferrule in mating relationship frictionally to secure the connector halves together and to maintain each of said coil springs in a compressed condition for applying an axial force on the respective terminals, maintaining the bared cable ends in face-to-face relationship within the intermediate sleeve and enhancing optical light transmission across the junction;

each of said coil springs serving also to absorb any tensile force that may be applied to its respective cable tending to separate the connector halves.

3,904,270

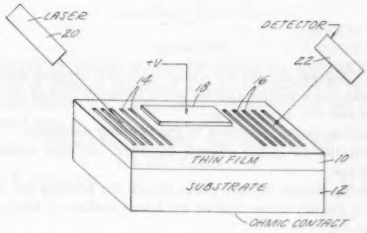
INTEGRATED OPTICAL SIGNAL PROCESSING SYSTEM

Peter K. Cheo, West Hartford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed Feb. 27, 1974, Ser. No. 446,579

Int. Cl.² G02B *5/14; G02F 1/29*

U.S. Cl. 350—96 WG **8 Claims**



1. Apparatus for deflecting a coherent optical guided wave by means of electric field induced birefringence comprising

an electrically conducting substrate,

a high resistivity thin film material fabricated on the surface of said substrate,

a single flat, metallic electrode having a surface area smaller than that of said thin film material located on the surface of said thin film material,

a voltage source,

means for applying said voltage source to said electrode to produce a potential difference between said electrode and said substrate and thereby generate an intense electric field in the portion of said thin film material between said electrode and said substrate, said electric field being oriented perpendicular to the plane of said thin film material, the portion of said thin film material containing said electric field having an index of refraction which is different from the index of refraction of the remainder of said thin film material,

means for generating a coherent optical beam,

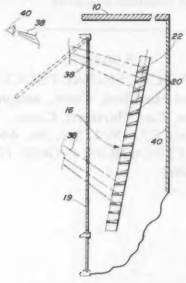
means for coupling said optical beam into said thin film material and causing said optical beam to propagate as a guided optical wave length along an optical waveguide which consists of said thin film material and said substrate so that a first laterally extending portion of the wave front intersects the portion of the thin film material containing the intense electric field and the remaining laterally extending portion of said wave front does not intersect the portion of the thin film material containing the intense electric field, said guided optical wave experiencing a phase variation and being deflected in the plane of said thin film material as a result of the differences in the index of refraction of the thin film material traversed by said optical wave along a given optical path length,

and means for coupling at least a portion of said deflected wave out of said thin film material.

3,904,271
SELECTION DISPLAY APPARATUS FOR COIN-OPERATED VENDING MACHINE

Herman J. Merrigan, Chicago, Ill., assignor to The Seeburg Corporation, Chicago, Ill.

Filed June 3, 1974, Ser. No. 475,567
Int. Cl.[2] G02B 7/18, 17/04, 27/02
U.S. Cl. 350—112 16 Claims



1. A selection display for a coin-operated vending machine for displaying selection display strips having a lexical message printed thereon comprising:

mounting means attached to the vending machine;

a plurality of prism means mounted on said mounting means;

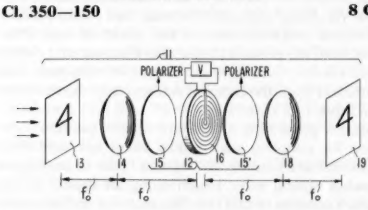
retaining means on said prism means for holding the selection display strips against the lower surface of said prism means;

each of said prism means being angularly oriented so that the critical viewing angle at which said selection display strips are visible converges at some point in the immediate proximity of said vending machine and said selection display strips become visible substantially simultaneously only as a customer approaches the immediate proximity of the vending machine.

3,904,272
MOSAIC LIGHT VALVE AND METHOD OF FABRICATING SAME

Emil R. Straka, Cupertino, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed June 1, 1973, Ser. No. 365,914
Int. Cl.[2] G02F 1/26
U.S. Cl. 350—150 8 Claims



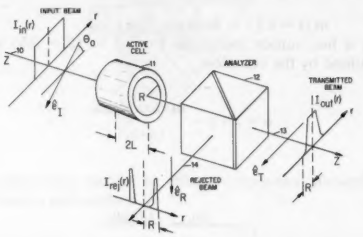
1. In a light valve, a solid plate comprising a fused glass assemblage, said plate having two opposed faces, a mosaic of transparent electro-optically active regions interconnecting said opposed faces, and an optically opaque material separating adjacent ones of said active regions; and

a plurality of optically transparent electrodes overlaying said opposed faces of said solid plate, said electrodes being formed in patterns for selectively applying an electric field across respective electro-optically active regions of said plate for electrically controlling an optical transmisson property of said respective regions.

3,904,273
APODISED APERTURE USING ROTATION OF PLANE OF POLARIZATION

William W. Simmons, Alamo; Gilbert W. Leppelmeier, Livermore, and Bertram C. Johnson, Sunnyvale, all of Calif., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 18, 1974, Ser. No. 452,165
Int. Cl.[2] G02F 1/22
U.S. Cl. 350—151 2 Claims

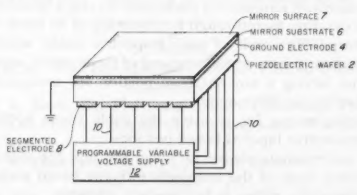


1. In an apodised aperture for optical beam shaping utilizing one or more polarizers and means for selectively rotating the plane of polarized radiation over the cross-section to effect the desired apodisation, the improvement comprising a magneto-optical Faraday cell constituting said means for selectively rotating the plane of polarized radiation, said Faraday cell comprising a centrally located glass rod and a counter-wound solenoid for producing an inhomogeneous magnetic field within which said glass rod is located, said solenoid of said Faraday cell comprising a central section containing clockwise windings for producing a positive magnetic field, and outer sections located an opposite sides of said central section containing counter-clockwise windings for producing a negative magnetic field.

3,904,274
MONOLITHIC PIEZOELECTRIC WAVEFRONT PHASE MODULATOR

Julius Feinleib, Cambridge, and Stephen G. Lipson, Belmont, both of Mass., assignors to Itek Corporation, Lexington, Mass.

Filed Aug. 27, 1973, Ser. No. 392,163
Int. Cl. G02f 1/34
U.S. Cl. 350—161 8 Claims



1. A piezoelectric wavefront modulator, comprising:

a. a monolithic piezoelectric medium which undergoes dimensional changes in response to an electric field impressed thereacross, said piezoelectric medium having a mirror surface on one side thereof;

b. means for providing said piezoelectric medium with a plurality of discretely electrically addressable locations; and,

c. means for addressing each discretely electrically addressable location with a variable strength voltage, said field being sufficient at each location to cause the piezoelectric medium to undergo continuous surface deformation

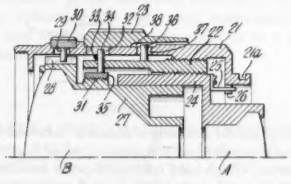
which is capable of correcting distortion in a wavefront striking said mirror surface of the piezoelectric medium.

3,904,275

MECHANISM FOR FOCUSING DIFFERENTLY SPACED OBJECTS

Yoshiro Noguchi, and Tsuneyo Metabi, both of Sakai, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 6, 1974, Ser. No. 467,344
Claims priority, application Japan, May 10, 1973, 48-55288
Int. Cl.² G02B 9/00
U.S. Cl. 350—175 FS **7 Claims**



1. A mechanism for modifying curvature of field formed by an objective lens including a front lens group and a rear lens group, the device comprising:

an outer tube mountable on a camera body;

a first tube provided within said outer tube and moveable along the optical axis of said objective lens and carrying said rear lens group;

a second tube provided within said outer tube and moveable along the optical axis of said objective lens and carrying said front lens group;

a focus ring rotatably provided on the outer peripheral wall of said outer tube;

a third tube provided within said outer tube and moveable along the optical axis of said objective lens;

a first means for moving both said first and second tubes with an air space varied therebetween in response to the rotation of said focus ring;

an operating member rotatably provided on the outer peripheral wall of said outer tube; and

a second means for moving only said first tube with an air space varied between said first and second lens groups in response to the rotation of said operating member.

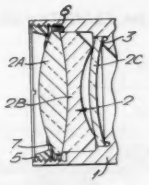
3,904,276

OPTICAL COMPONENTS

Raymond Whitaker, and Dennis William Barker, both of Leeds, England, assignors to The Rank Organisation Limited, London, England

Filed Dec. 13, 1973, Ser. No. 424,324
Claims priority, application United Kingdom, Dec. 13, 1972, 57377/72
Int. Cl.² G02b 7/02
U.S. Cl. 350—252 **7 Claims**

1. A mounting device for an optical component, comprising a hollow body having an internal shoulder against which an optical component bears in use of the device, and an annular clamping element in screw-threaded engagement with the body, wherein the improvement consists in the clamping element having at least one radially inwardly projecting integral deformable resilient lip which, upon assembly of an optical component in the device, bears against a surface of the optical component opposite that which bears against the shoulder to



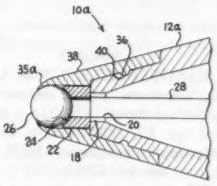
clamp said component resiliently against the said internal shoulder of the body.

3,904,277

OPTICAL HAND SCANNER OPTICAL ASSEMBLY

Richard R. Phillips, Stamford, Conn., and Robert G. Peterson, Cross River, N.Y., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Mar. 20, 1974, Ser. No. 452,755
Int. Cl.² G02B 7/02
U.S. Cl. 350—252 **12 Claims**



1. An optical light pen for use in the reading of an encoded record member, the combination comprising:

A. a housing having a longitudinally extending opening and an apex at one end thereof;

B. an annular seat member received within said opening and secured within said housing:

C. a ring member securely received within said housing coaxially with and adjacent said annular seat member;

D. a spherical transparent lens rotatably received within said opening at the apex and supported by said seat member;

E. the apex of the housing having a curvilinear portion which engages the spherical lens to firmly hold the spherical lens against itself and against said annular seat;

F. a first fiber optics bundle received within the opening of said ring member and extending longitudinally within said housing for conveying light from said housing through said lens; and

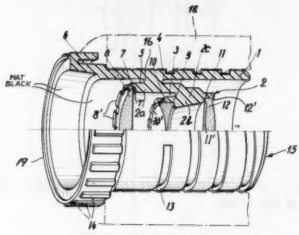
G. a second fiber optics bundle received within the opening of said ring member and extending longitudinally within said housing for receiving said sensing light passing through said lens into said housing.

3,904,278

PLASTIC LENS MOUNTING FOR OPTICAL SYSTEM

Lothar Hummel, Gottingen, Germany, assignor to ISCO Optische Werke GmbH, Gottingen, Germany

Filed Nov. 12, 1973, Ser. No. 414,827
Claims priority, application Germany, Nov. 10, 1972, 2254954
Int. Cl.[2] G02B 7/02
U.S. Cl. 350—255 14 Claims



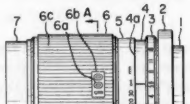
1. A lens mounting for an optical system, comprising a unitary body of plastic material centered on an axis, said body including an outer shell and a tubular insert connected with said shell by a narrow annular bridge, said insert being separated over a major part of its length from said shell by an annular clearance and being subdivided into a plurality of coaxial rings interconnected along a fraction of their axial length, said rings having together et least three axially projecting end portions forming respective lens seats.

3,904,279

INTERCHANGEABLE LENS FOR A CAMERA

Noriaki Sanada, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 23, 1974, Ser. No. 463,245
Claims priority, application Japan, May 7, 1973, 48-50904
Int. Cl.[2] G02B 7/02
U.S. Cl. 350—257 3 Claims



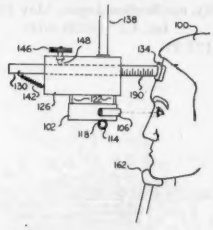
1. An interchangeable lens for a camera which comprises in combination:
- a stationary member detachably securable to a camera;
- a lens frame movably held in said stationary member;
- an adjustment ring rotatably mounted around said stationary member; and
- a cylindrical covering made of a flexible material fitted around the outer periphery of said adjustment ring, and having on the peripheral surface thereof an indicia formed in relief such as to identify the focal length of the interchangeable lens both by sight and touch.

3,904,280

METHOD AND APPARATUS FOR DETERMINING THE DISTANCE BETWEEN THE SURFACE OF AN EYE AND A REFERENCE POINT

George W. Tate, Jr., Dallas, Tex., assignor to Giles C. Clegg, Jr. and John R. Lynn, both of Dallas, Tex., part interest to each

Filed Dec. 28, 1973, Ser. No. 429,020
Int. Cl.[2] A61B 3/10; G01C 3/00
U.S. Cl. 351—1 12 Claims



1. Apparatus for defining a distance between the surface of the eye of a person and a reference point comprising
- a frame on which said reference point is defined, first projecting means carried by said frame and positioned on one side of the reference point for projecting an image in a first direction generally toward the person's eye,
- second projecting means carried by said frame and positioned on the other side of the reference point for projecting an image in a second direction generally toward the eye,
- said projecting means being positioned so that the projected images will be superimposed on each other on the surface of the eye when the eye is located at a predetermined distance from the reference point,
- a housing secured to said frame,
- movable headrest means extending from said housing for contacting the head of the person and movable with respect to the reference point,
- biasing means for urging the headrest towards the person and maintaining contact between headrest and the head of the person when the head is within a certain distance of the reference point and
- an indicating means for providing an indication of the position of said moveable headrest means relative to the reference point.

5. Apparatus as in claim 1 wherein said indicating means comprises indicia on said movable means for indicating the position of said headrest relative to said reference point.

3,904,281

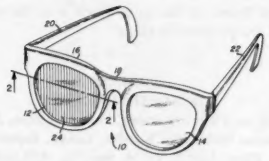
FLEXIBLE REFRACTING MEMBRANE ADHERED TO SPECTACLE LENS

Arthur Jampolsky, Belvedere, Calif., assignor to Optical Sciences Group, Inc., San Rafael, Calif.

Continuation-in-part of Ser. No. 878,975, Dec. 8, 1969, Pat. No. 3,628,854, which is a continuation of Ser. No. 647,533, June 20, 1967, abandoned. This application June 28, 1971, Ser. No. 165,800The portion of the term of this patent subsequent to Dec. 21, 1988, has been disclaimed.
Int. Cl.[2] G02C 7/08; G02B 3/08
U.S. Cl. 351—159 12 Claims

1. A device for use in combination with a spectacle lens through which light rays are transmitted to an eye, comprising:
a. a thin, flexible membrane formed of light transmitting plastic material and having opposed surfaces;
b. one of said opposed surfaces being planarly smooth and adapted for adherence in conforming relationship to a light transmitting surface of said spectacle lens and;

c. the other of said opposed surfaces having formed therein light refracting elements, the refractive properties of which are substantially unaffected by such adherence and



which refractive properties differ from those of said element for refracting the light rays transmitted by said element and said membrane to said eye in a predetermined manner.

3,904,282

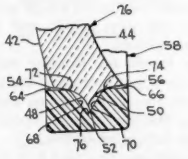
SPECTACLE LENSES HAVING PEAKED EDGES

Craig S. Batista, 342 Leon Ave., Perth Amboy, N.J. 08861

Continuation of Ser. No. 296,873, Oct. 12, 1972, abandoned. This application June 7, 1974, Ser. No. 477,462

Int. Cl. G02c *7/02*

U.S. Cl. 351—174 **9 Claims**



1. A spectacle assembly including

a rim having

a V-shaped channel with straight sidewalls intermediate

a pair of flat shoulders,

a lens body mountable in said rim and including

a first face and

a second face, said first and second faces respectively having

first and second peripheral ends, said first and second ends terminating at

a peaked edge, said peaked edge including

a pair of outwardly concave surfaces converging at

a peak intermediate said first and second ends, said outwardly concave surfaces comprising

curved surfaces, each curved surface extending between said peak and the adjacent one of said first and second ends, the angles between a line bisecting the peak and lines tangent to each of the curved surfaces adjacent said ends closely approaching 90°, said channel having

a pair of support edges each at an intersection of the channel with said flat shoulders, said channel being of a width and depth sufficient to receive said peaked edge freely therein, and

said support edges being positioned to contact and support the adjacent one of the curved surfaces of the lens body with said first and second ends and the adjacent portions of the curved surfaces closely adjacent said flat shoulders of said rim and with said peaked edge spaced from the sidewalls and the apex of said V-shaped channel.

3,904,283

CARTRIDGE-TYPE AUDIO-VISUAL PROJECTOR

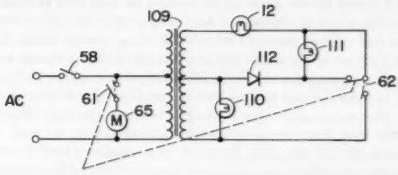
Kiyoyuki Arai, Tokyo, Japan, assignor to Kabushiki Kaisha Koparu, Tokyo, Japan

Filed Sept. 21, 1973, Ser. No. 399,520

Claims priority, application Japan, Sept. 22, 1972, 47-95449

Int. Cl.² G03B *23/02*

U.S. Cl. 352—72 **4 Claims**



1. An audio-visual projector comprising a body case, a guide portion formed in said body case, optical and magnetic sound reproducing means positioned adjacent to said guide portion and being selectively movable to a working position by the setting operation of said film cartridge, optical and magnetic sound reproducing circuits connected to said optical and magnetic sound reproducing means, respectively, a projection lamp positioned adjacent to said guide portion, a lamp circuit included in said body case to control the lighting of said projection lamp, a lens block positioned adjacent to said guide portion and being movable into the light path of said projection lamp, and a screen positioned on one side wall of said body case and being receivable of the light from said projection lamp through said lens block, said magnetic sound reproducing circuit containing a magnetic head, an input circuit connected to said magnetic head, and a transistor having the collector electrode connected to said input circuit, and when said optical sound reproducing means is moved to its working position, both terminals of said magnetic head are short-circuited through said input circuit and said transistor.

3,904,284

RECHARGEABLE MAGAZINE FOR MOTION PICTURE FILM

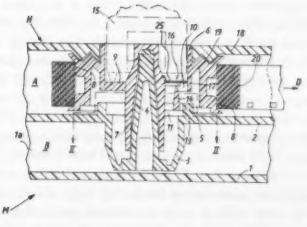
Rudolf Blank, Cologne-Dunnwald, and Achim Kluczynski, Porz-Eil, both of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 417,182, Nov. 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 256,913, May 25, 1972, abandoned. This application Sept. 12, 1974, Ser. No. 505,600

Claims priority, application Germany, May 28, 1971, 2126636

Int. Cl.² G03B *23/02*

U.S. Cl. 352—78 R **7 Claims**



1. A rechargeable magazine for photographic roll film, comprising a housing defining a chamber for a supply of convoluted film, said housing having a first opening communicating with said chamber; a hollow core projecting into said chamber through said opening to support the convoluted film,

said core being rotatably mounted in said housing and said housing comprising a member extending into said core; light excluding means surrounding said opening to prevent entry of light into said chamber between said core and said housing; means for blocking rotation of said core in one direction, said blocking means being located in said core and being mounted partly on said core and partly on said housing, said blocking means including a first portion which rotates with said core and a second portion provided on said member of said housing and located in the path of movement of said first portion to normally prevent rotation of said core in said one direction, at least one of said portions of said blocking means being movable relative to the other portion of said blocking means to an inoperative position in which said first portion is free to bypass said second portion to thus permit rotation of said core in said one direction, said core having a second opening disposed within said first opening and affording access to said one portion of said blocking means so as to enable a tool to reach and move said one portion to said inoperative position without any destruction of said housing and said core; and means for preventing entry of light into said chamber by way of said second opening.

3,904,285

MICROREADER HAVING AN AUTOMATIC CARD SELECTION AND RETRIEVAL APPARATUS

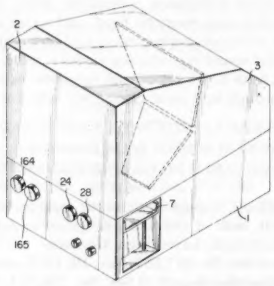
Nobuyuki Yanagawa, Oi-Yamada, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed July 27, 1973, Ser. No. 383,159

Claims priority, application Japan, July 31, 1972, 47-75887

Int. Cl. G03b *23/08, 21/28*

U.S. Cl. 353—27 **5 Claims**



1. A microreader having a projection screen and comprising:

card selection means comprising means for receiving a card cassette storing a plurality of cards arranged in a randoom sequence in the cassette, each card having a side made of a magnetic material and having a selected pattern of notches, and each card having a plurality of frames arranged in rows and columns along the X and Y direction, and means including a plurality of selector bars and magnetic means engaging the notched side of the cards to move a card having a selected pattern of notches to a selected position in a projection plane;

an optical system comprising, in sequence along an optical axis, a light source, a condenser lens system, a projection lens system and a first, second and third mirror with a light beam emanating from the light source, proceeding along said optical path and impinging on the projection screen, with said projection plane being disposed between the condenser lens system and the projection lens system;

means operative in response to electrical frame selection signals for moving the card which is in said selected position in the projection plane in the X direction in the projection plane to align a selected row of frames with the optical path portion between the condenser and the projection lens systems; and

means operative in response to said electrical frame selection signals for moving the light source, the condenser and projection lens systems and the first mirror as a unit along said Y direction to align said beam with a selected column of frames, to thereby project on the screen a selected frame of the card which is in the selected position of the projection plane.

3,904,286

MICROFILM READER

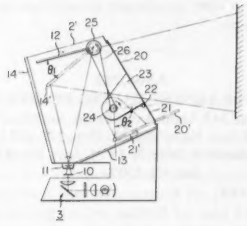
Kokichi Omi, and Shunzo Inoue, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1974, Ser. No. 459,368

Claims priority, application Japan, Apr. 19, 1973, 48-44439

Int. Cl.² G03B *21/10, 21/28*

U.S. Cl. 353—71 **11 Claims**



1. In a film reader having an image projecting means and provided with a reflection screen and a reflection mirror within a casing comprising:

first pivotable means for pivoting the reflection mirror provided at an upper portion of the casing;

second pivotable means for opening and closing a rear wall of the casing which is facing an opening of the casing for observing the reflection screen;

belt means interconnecting said first pivotable means and said second pivotable means; and

operating means for driving said belt means;

whereby a projected image is selectively projected, thro ugh the reflection mirror, onto said reflection screen or onto a screen provided outside the film reader through the opening at the rear wall of the casing.

3,904,287

REVERSIBLE PROJECTOR SLIDE CHANGE OF THE SLIDE STACK TYPE

Yoshiro Matsumura, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 9, 1973, Ser. No. 404,469

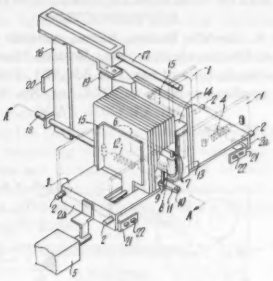
Claims priority, application Japan, Oct. 18, 1972, 47-119616

Int. Cl.² G03B *23/14*

U.S. Cl. 353—114 **3 Claims**

1. In a slide projector, a longitudinally extending slide stack support tray, a spacer member mounted on said tray and longitudinally shiftable between front and rear positions and dividing the slides carried by said tray into front and rear stacks having confronting longitudinally spaced inner slides, said tray including a slide stack supporting bottom section longitudinally shiftable with said spacer member, a transversely reciprocatable slide changer member including a slide extractor element transversely movable between said confronting inner slides along a path alternatively registering with the inner slides of said front and rear stacks when said spacer member is in its rear and forward positions respectively, an inwardly directed slide return guide member alternatively shifted into engagement with said front and rear stack inner

slides with said spacer member being in its rear and forward positions respectively, and including a finger pivoted at its outer end to said tray bottom section for swinging about a



vertical axis between said stacks, and spring means resiliently biasing the free end of said finger into alternative engagement with said front and rear stack inner slides.

3,904,288

PHOTOGRAPHIC SLIDE PROJECTOR

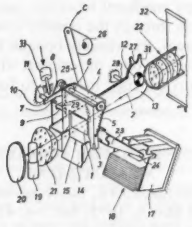
Reinhard Sobotta, Mascherode, Germany, assignor to Rollei-Werke Franke & Heidecke, Braunschweig, Germany

Filed Mar. 1, 1974, Ser. No. 447,280

Claims priority, application Germany, Mar. 15, 1973, 2312791

Int. Cl.[2] G03B *23/02*

U.S. Cl. 353—118 **12 Claims**



1. A photographic slide projector comprising means forming an optical projection axis, means for holding a stack of slides (**18**) in a position beneath said axis, a gate assembly (**3, 4**) for holding a picture slide in a projection position aligned with said axis and in a projection plane perpendicular to said axis so that an image of such slide may be projected along said axis, a gripping device (**14**) for gripping a first slide at one end of said stack (**18**) and moving such first slide upwardly toward said gate assembly, and means for moving said gate assembly downwardly from said projection position to a loading position just above said first slide in order to receive said first slide when it is raised by said gripping device, said gate assembly comprising (**3**) gate guide member **3** and a clamping member (**4**) movable toward each other to clamp a picture slide between the two members and movable away from each other to release the clamped slide from between the two members, said gate assembly having a rounded inlet at its lower edge, shaped to receive said first slide when raised by said gripping device and to obstruct upward movement of a second slide which may tend to move upwardly with the first slide on account of frictional engagement with it.

3,904,289

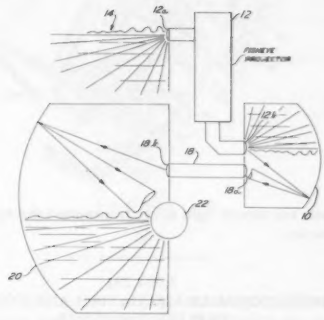
FLIGHT SIMULATOR VISUAL DISPLAY SYSTEM

William C. Yager, Blue Bell, Pa., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 10, 1975, Ser. No. 540,047

Int. Cl.[2] G03B *37/00, 21/60, 21/28;* **G09B** *9/08*

U.S. Cl. 353—122 **6 Claims**



1. Apparatus for displaying the image of a scene in proper perspective and with conservation of scene brightness, comprising:

a first substantially spherical dimpled mirror;

first scene projector means, positioned within said first mirror, for projecting an image of said scene upon said first mirror;

a second substantially spherical dimpled mirror having an entrance pupil and an exit pupil located at conjugate points;

second scene projector means, substantially positioned at the entrance pupil of said second mirror, for projecting the image of said scene upon said second mirror; and

scene receptor and relay means, having a portion thereof positioned within said first mirror at a substantially conjugate point with respect to said first scene projector means, for receiving the reflected image from said first mirror and for providing said image to said second scene projector;

whereby said scene image may be viewed at said exit pupil of said second mirror.

3,904,290

OPTICAL SYSTEM ALIGNMENT APPARATUS

Wayne L. Kidd, and Stephen C. Corona, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Feb. 4, 1974, Ser. No. 439,172

Int. Cl. G03g *15/00*

U.S. Cl. 355—8 **5 Claims**

1. An electrophotographic printing machine, including:

a movable frame member;

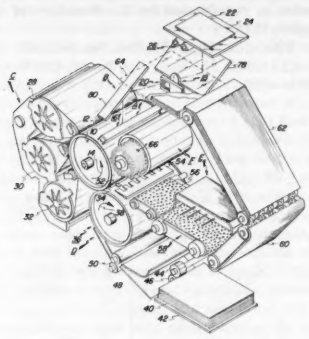
a light source mounted on said frame member;

lens means arranged to create a light image from the light rays transmitted thereto;

an alignment member in a light receiving relationship with the light rays transmitted from said light source, said alignment member being adapted to reflect light rays therefrom to said lens means for creating a sample light image therefrom; and

means for indicating the position of the sample light image

so as to determine alignment of the optical system, said indicating means being in a light receiving relationship with the sample light image transmitted through said lens means.



3,904,291

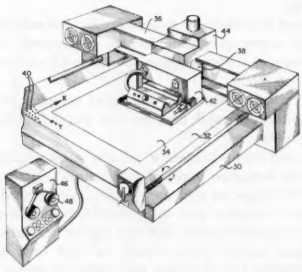
PHOTOEXPOSURE MECHANISM AND CONTACT PRINTER THEREFOR

Ronald B. Webster, Melrose, Conn., assignor to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed Dec. 18, 1972, Ser. No. 316,010

Int. Cl. G03b *27/00;* **G03B** *27/02;* **G03b** *27/32*

U.S. Cl. 355—19 **2 Claims**



1. A mechanism for exposing an artwork on a photosensitive surface, said mechanism comprising means providing a work surface for supporting a sheet of material with a photosensitive surface, a contact printing device, a line drawing device, and means including automatic controller for moving both said contact printing device and said line drawing device in a plane parallel to said work surface to being said contact printing device into registry with selected areas of said photosensitive surface and to move said line drawing device along desired lines on said photosensitive surface, said contact printing device including means operable when said contact printing device is held stationary relative to said photosensitive surface for exposing a predetermined portion of an artwork on the area of said photosensitive surface registered therewith, said contact printing device further including a light source and a photomask arranged parallel to said work surface and located between said work surface and said light source, said photomask being generally planar and being divided into a number of discrete areas, and said light source including means for illuminating selected ones of said discrete areas of said photomask, and said line drawing device including means for directing a spot of light onto said photosensitive surface as said line drawing device is moved relative to said photosensitive surface to cause the exposure of a line on said photosensitive surface.

3,904,292

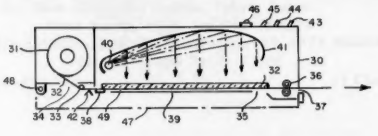
APPARATUS FOR SINGLE SHEET PHOTOGRAPHIC REPRODUCTION

Leonard E. Ravich, Boston, Mass., assignor to Institute for Graphic Communication, Inc., Boston, Mass.

Continuation-in-part of Ser. No. 330,981, Feb. 9, 1973. This application Mar. 4, 1974, Ser. No. 447,532

Int. Cl. G03b *27/30*

U.S. Cl. 355—100 **26 Claims**



1. An apparatus for making a right reading, positive, single sheet copy of an original, said apparatus comprising, in combination a diffusion transfer copy medium and having a positive image receiving layer separated from a negative photographic layer by a visually opaque layer, a chamber having one wall which defines an exposure zone and a light source in said chamber for providing sufficient light to form a latent image in said copy medium; means to uniformly distribute light over said copy medium; means for advancing said copy medium in sheet form a storage position inside from said chamber, along a path outside of said chamber into optical communication with said exposure zone, and back into said chamber for development; means to develop said copy medium; said copy medium, when in optical communication with said exposure zone, being disposed such that an original to be copied can be placed in face to face contact with the negative photographic layer of said copy medium, whereby, upon exposure, light passes successively through the positive image receiving layer of the copy medium, the visually opaque layer, the negative photographic layer and onto the original where it is imagewise reflected back into the copy medium to form a latent image.

3,904,293

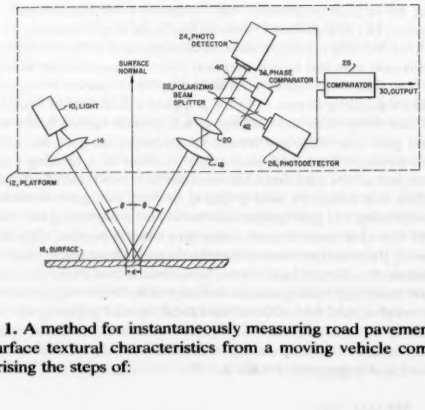
OPTICAL METHOD FOR SURFACE TEXTURE MEASUREMENT

Sherman Gee, 106 Shaw Ave., Silver Spring, Md. 20904

Filed Dec. 6, 1973, Ser. No. 422,244

Int. Cl.[2] G01J *4/00;* **G01B** *11/30*

U.S. Cl. 356—118 **2 Claims**



1. A method for instantaneously measuring road pavement surface textural characteristics from a moving vehicle comprising the steps of:

directing a beam of polarized light from said moving vehicle at an angle of incidence θ with respect to the surface normal; collecting the light reflected from said surface at an angle of reflection θ with respect to the surface normal;

separating the collected light by means of a device for splitting the light into a first principal polarized wave component and second orthogonal polarized wave component of polarized light; directing said first principal polarized wave component into a first photodetector and said second orthogonal polarized wave component into a second photodetector;

and comparing the outputs of said first and second photodetectors by measuring the ratio of the amplitudes of said first and second components of light to indicate the change in polarization of said light source, said polarization change providing the textural characteristics of said road pavement surface.

3,904,294

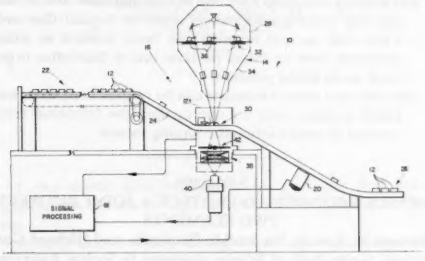
AUTOMATIC LENS TESTING APPARATUS

Nathan Gold, Framingham, and William T. Plummer, Concord, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 28, 1973, Ser. No. 429,144

Int. Cl. G01b *9/00*

U.S. Cl. 356--124 **37 Claims**



1. A multiplexed acceptance testing apparatus for evaluating a test lens, said multiplexed acceptance testing apparatus comprising:

a test station for releasably positioning said test lens; and

a plurality of optical paths multiplexed through said test lens each said optical path having an orientation, relative to the optical axis of said test lens, different from the orientation of each other said optical path, each said optical path including, a light source, a test pattern in the field of view of said test lens, means to illuminate said test pattern with light from said source, and means for sampling an image of said target formed by said test lens and for producing a measureable effect that is a function of said test lens' contrast transfer efficiency.

3,904,295

METHOD AND APPARATUS FOR THE NO-CONTACT MEASUREMENT OF VELOCITIES, CHANGES IN RELATIVE POSITION, OR DISPLACEMENT PATHS

Fromund Hock; Knut Heitmann, both of Wetzlar, and Dietmar Kaul, Solms, all of Germany, assignors to Ernst Leitz G.m.b.H., Wetzlar, Germany

Filed July 30, 1973, Ser. No. 383,780

Claims priority, application Germany, July 31, 1972, 2237564

Int. Cl.² G01P *3/36*

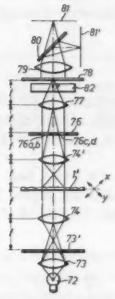
U.S. Cl. 356—167 **33 Claims**

11. Apparatus for measuring a property of movement of a light dispersing object in at least one coordinate direction comprising:

a. a light source, which is arranged to illuminate said object;

b. means selecting at least two differently oriented beams from light modulated at said object, determining the solid angles of said beams and suppressing light unmodulated or respectively dispersed into very large angles at said object;

c. optical imaging means to form an optical image of said object;



d. at least one optical component, having negligible light absorption and the property of determining the angular relationships among at least three optical wave fronts, to further modulate light fluxes from said angle areas of said imaging beams having equal modulation phase;

e. photoelectric receiving means producing an individual electrical signal from each respective one of said further modulated fluxes; and

f. evaluating means to produce from said signals an output signal indicative of the property of movement.

3,904,296

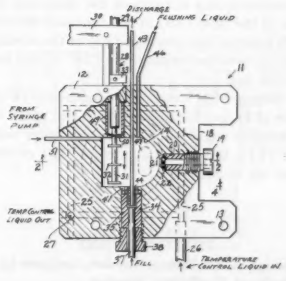
APPARATUS FOR DERIVING OXYGEN ASSOCIATION RATE CURVES FOR BLOOD SAMPLES

Lutz A. Kiesow, Bethesda, Md., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Continuation-in-part of Ser. No. 351,014, April 13, 1973, Pat. No. 3,854,878. This application Apr. 8, 1974, Ser. No. 459,226

Int. Cl.² G01N *21/06*

U.S. Cl. 356—246 **21 Claims**



1. An absorbance cell system for use in a photometer comprising a chamber having opposite transparent wall portions arranged for transmitting light beams through the chamber, means to introduce a sample into the chamber in gas-transfer relationship with the interior of the chamber, a source of deoxygenating liquid material, controlled conduit means connecting said deoxygenating material source to said chamber, overflow conduit means communicating with said chamber, a

source of liquid oxygenating reagent, and controlled conduit means connecting said last-named source to said chamber.

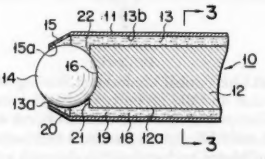
17. An absorbance cell for use in a photometer comprising a chamber having transparent wall portions arranged for transmitting light beams through the chamber, means to inject a sample into the chamber, inlet conduit means connected between said chamber and a supply of reagent, and overflow conduit means connected to the chamber and including a restriction sufficient to separate the sample from overflow reagent leaving the chamber through said overflow conduit means.

3,904,297

SOCKET FOR HOLDING THE WRITING BALL OF A BALL-POINT PEN

Jiro Hori, Kure, Japan, assignor to The Sailor Pen Co., Ltd., Nihonba, Japan

Filed June 18, 1974, Ser. No. 480,516
Claims priority, application Japan, June 29, 1973, 48-76588
Int. Cl.[2] B43K *7/10*
U.S. Cl. 401—216 **6 Claims**



1. A socket for holding the writing ball (**14**) of a ball point pen, comprising:

a tubular member (**11**) having a longitudinally directed hole (**13**) formed therein and extending along the tubular member (**11**), said hole (**13**) having at least a longitudinal portion of generally rectangular cross-section at the forward end portion thereof for surrounding the writing ball (**14**) at said forward end portion thereof;

a geneally conical tip portion (**15**) formed at said forward end portion of the tubular member (**11**) for retaining the writing ball (**14**) in the reduced portion of the cone of the generally conical tip portion (**15**);

a plurality of generally triangular ink outlets (**20**) formed in the inner walls (**15a**) of the tip portion (**15**) and extending along the tip portion (**15**) so as to communicate with the outside of the socket at the forward end thereof and with corresponding corners of the generally rectangular portion of the hole (**13**) at the rear end thereof;

a rod (**12**) inserted into the hole (**13**) of the tubular member (**11**) to receive the writing ball (**14**) at the forward end of the rod; and

ink duct means (**18**) extending lengthwise of the tubular member (**11**) and formed between the inner walls (**13***a*) of the tubular member (**11**) and the outer wall (**12***a*) of the rod (**12**), the ink duct means (**18**) communicating with the ink outlets (**20**).

3,904,298

FRICTION JOINT

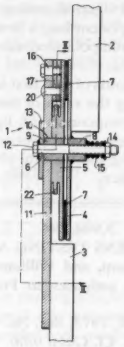
Malkolm Lindgren, Skelleftea, Sweden, assignor to AB Holmbom & Hedlund, Skelleftea, Sweden

Filed Oct. 9, 1973, Ser. No. 404,589
Claims priority, application Sweden, Oct. 9, 1972, 1300/72
Int. Cl. F16d *1/12, 3/10*
U.S. Cl. 403—93 **4 Claims**

1. A friction joint between two members of the type wherein one said member may be freely rotated about the other member in either direction from an initial position independently of a frictional coupling but thereafter becomes locked in place and can then be rotated in the opposite direction only by overcoming the restraining frictional coupling, said friction joint apparatus comprising:

a common axle for both said members,

a disc frictional coupling means mounted therein, said disc being rotatable about said axle and being in frictional engagement with a first of said members,



and locking means on a second of said members and on said disc for locking said second member to said disc only when said second member has been rotated in either direction from an initial position and is thereafter urged back to its initial position,

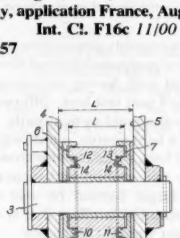
whereby said second member can be rotated back to its said initial position only by overcoming the frictional force exerted by said frictional coupling means.

3,904,299

DEVICE INTENDED TO PROTECT A JOINT BETWEEN TWO ELEMENTS

Bernard M. Loonis, Nanteuil-la-Haudouin, and Richard Goddard, Senlis, both of France, assignors to Societe Anonyme: Poclain, Belleville, France

Filed Aug. 9, 1974, Ser. No. 496,277
Claims priority, application France, Aug. 9, 1973, 73.29222
Int. Cl. F16c *11/00*
U.S. Cl. 403—157 **5 Claims**



1. An assembly comprising

a spindle,

a first element mounted on the spindle and having a cylindrical surface,

a second element, said second element having two flanges, the first element lying between the flanges and the flanges acting as stops to limit relative axial displacement between the first and second elements,

two plates, each disposed with a clearance between the first element and a respective one of the flanges of the second element, each said plate having a first surface facing

towards the adjacent flange and a second, opposing, surface, the first surface being magnetic, and the second surface including a cylindrical bearing portion substantially co-axial with the spindle, and

sealing means, said cylindrical bearing portion co-operating with said cylindrical surface via said sealing means.

3,904,300

ELASTIC JOINT AND METHOD OF ASSEMBLY FOR INTERCONNECTING STEERING LINKAGES, ESPECIALLY OF MOTOR VEHICLES

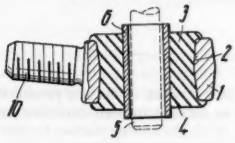
Richard Hetmann, Tamm, Germany, assignor to Firma Dr. -Ing. H.c.F. Porsche K.G., Germany

Filed Mar. 29, 1973, Ser. No. 346,062

Claims priority, application Germany, Mar. 29, 1972, 2215330

Int. Cl.[2] F16F *1/38*

U.S. Cl. 403—203 **22 Claims**



1. An elastic joint installation for joining a first linkage section to a second linkage section; said installation comprising:

bushing sleeve means having an axially extending central opening for accommodating a hinge bolt of said first linkage section,

joint eye means having an axially extending joint eye opening which surrounds said sleeve means, said opening having a first surface defining an outline of a first given shape which is continuous along substantially the entire extent of the opening,

means for connecting said joint eye means to said second linkage section,

and pretensioned elastic bushing means having a second surface defining an outline of a second given shape different from said first given shape in the unpretensioned condition of the elastic bushing means, said elastic bushing means being interposed in said joint eye opening in surrounding relationship with said sleeve means, being engaged with said sleeve means and being retained and engaged by said joint eye means such that movement of said sleeve means in radial directions with respect to a hinge bolt axis through said central opening is resiliently resisted by said elastic bushing means,

wherein the surface of said joint eye opening surrounds the surface of said elastic bushing means to exhibit different resilience in different radial directions of movement of said sleeve means, such that a direct transmission of forces at opposite points of contact between said elastic bushing means and said joint eye opening through said elastic joint installation is ensured in a first radial direction while a simultaneous substantially extensive damping of forces through said elastic joint installation is achieved in a second radial direction, and wherein the joint eye opening and the bushing means are engaged such that the first and second surfaces define outlines having a similar shape.

3,904,301

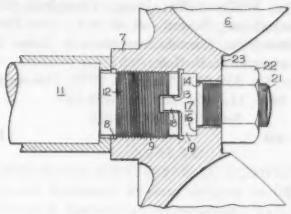
HUB LOCKING ARRANGEMENT

Earle E. Schroeder, New Richmond, Ohio, assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed July 24, 1974, Ser. No. 491,358

Int. Cl.[2] F16D *1/06*

U.S. Cl. 403—259 **1 Claim**



1. The combination of a hub releasably attached to a rotatable shaft comprising: walls defining a stepped opening through said hub of two different diameters with an annular shoulder defined by the junction between said different diameters; an internal thread formed on the larger diameter portion of said opening; a thread on the end portion of said shaft of the same pitch and hand as said internal thread, said hub being threaded onto said shaft; locking means having an annular flange contacting said shoulder and including a threaded portion extending through said hub opening of smaller diameter and terminating on the exterior of said hub remote from said shaft, said threaded portion of said locking means having a different hand thread than said shaft thread; means releasably connecting said locking means to said shaft to prohibit relative rotational movement therebetween; and a nut threaded onto the threaded portion of said locking means on the exterior of said hub and engaging the surface of said hub.

3,904,302

EXPANSION GAP SEALING DEVICE

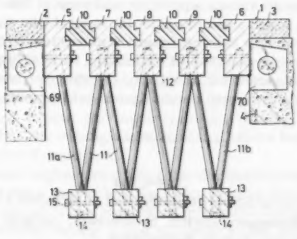
Silvio Bertschmann, Meggen, Switzerland, assignor to Friedrich Maurer Soehne, Munich, Germany

Filed Nov. 21, 1972, Ser. No. 308,452

Claims priority, application Switzerland, Nov. 23, 1971, 17023/71

Int. Cl.[2] E01C *11/12*; **E04F** *15/14*

U.S. Cl. 404—68 **13 Claims**



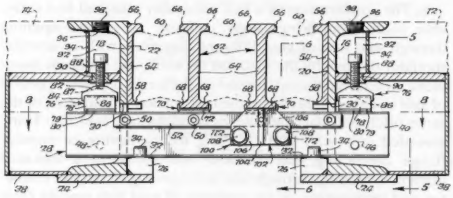
1. An expansion gap sealing device for bridging an expansion gap between edges of structural members, comprising rigid strips and compressible strips arranged in an alternating manner and extending alongside each other and longitudinally inside the gap to form an expansion and sealing assembly having outer sides connected to the edges of the gap, supporting structure means comprising rod-like legs having upper ends connected to said rigid strips, said legs extending and converging downwardly into the gap, said legs having lower

ends, and lower means connecting said lower ends of the legs to form springy pairs of legs elastically supporting said assembly in response to the movement of said edges.

3,904,303
COMPOSITE EXPANSION JOINT ASSEMBLY

H. Allen Becht, Williamsville; James Campbell, Kenmore; James J. Kerschner, Boston, all of N.Y., and Edward J. Krollman, Hamilton, Canada, assignors to Acme Highway Products Corporation, Buffalo, N.Y.

Division of Ser. No. 339,572, March 9, 1973. This application Mar. 11, 1974, Ser. No. 450,107
Int. Cl.² E01C *11/02*
U.S. Cl. 404—68 **11 Claims**



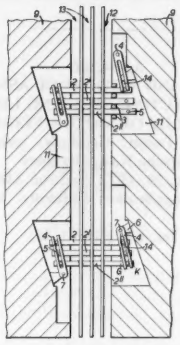
1. A composite expansion joint assembly comprising: a pair of edge members adapted to define the opposite sides of an expansion groove between bridge deck sections; at least one of said edge members having openings therethrough; laterally spaced support bars extending transversely of said groove with at least one end of said bar extending through said openings beyond the side of said groove; a plurality of elongated resiliently yieldable sealing elements in a side-by-side relation extending longitudinally of said groove; elongated rigid structural members interposed between said sealing elements and extending lengthwise thereof; said structural members being supported on said support bars for lateral sliding movement relative thereto; means supporting said support bars for sliding movement relative thereto adjacent at least one end thereof; restraining means bearing against said support bars adjacent at least said one end thereof for limiting vertical displacement thereof, and means for selectively adjusting the bearing pressure of said restraining means against said support bar.

3,904,304
EXPANSION JOINTS FOR A ROADWAY

Heinrich Honegger, Zurich, Switzerland, assignor to Honel Holdings AG, Zurich, Switzerland

Filed May 1, 1974, Ser. No. 466,072
Claims priority, application Austria, May 7, 1973, 3984/73
Int. Cl.² E01C *11/02*
U.S. Cl. 404—69 **13 Claims**

1. An expansion joint for a roadway or other structure comprising at least one supporting bar for dividing the gap between two parts of the structure into part-gaps, the bar having a rigid connection to a second bar, said second bar extending across the gap between a pair of joint members arranged to be mounted in respective spaces one in the face of each of the structure parts facing the gap, the second bar cooperating with a sliding bearing in each joint member;

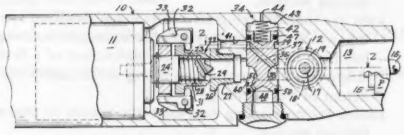


whereby a change in the width of the gap retains the relative position of the bar in relation to both structure parts.

3,904,305
SPEED SENSING AIR TOOL SHUTOFF

Horace Edward Boyd, Euclid, Ohio, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 19, 1974, Ser. No. 498,619
Int. Cl.² F01B *25/06*
U.S. Cl. 415—25 **11 Claims**



1. A speed sensitive shutoff for a rotary air tool having an air motor operable by a throttle valve with an air passage therebetween,

a main air valve in said air passage between the air motor and the throttle valve including means biasing the valve toward its closed position to close off said air passage,

means for opening said main valve in response to the attainment of a predetermined upper motor speed level and for closing said main valve in response to the attainment of a predetermined lower motor speed level,

a normally open starting valve positioned in parallel relationship with said main air valve and effective to bypass air around said main air valve to said motor, and

means for closing and maintaining closure of said starting valve during operation of the tool after said main valve has opened and until the throttle valve is closed,

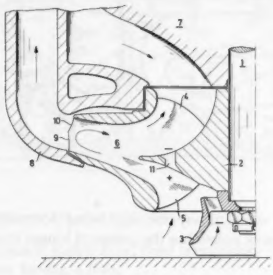
whereby, while the throttle valve of the tool is open, the air supply to the air motor continues until the motor speed slows to said predetermined lower motor speed level, then ceases until the throttle valve is closed and reopened.

3,904,306

TWO-WAY IMPELLER IN A CENTRIFUGAL PUMP HAVING VERTICAL DRIVE SHAFT

Olav Rasmusson Navelsaker, Nordengveien, Norway, assignor to Thune-Eureka A/S, Oslo, Norway

Filed Feb. 5, 1974, Ser. No. 439,766
Claims priority, application Norway, July 5, 1973, 2767/73
Int. Cl.[2] F04D 7/02, 29/26
U.S. Cl. 415—53 2 Claims



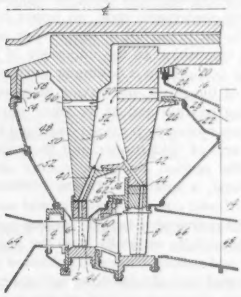
1. A vertical centrifugal pump comprising a casing, an impeller, means mounting said impeller for rotation in said casing about a vertical axis, said impeller comprising upper and lower annular end members that are vertically spaced apart and spaced radially outwardly from the axis of rotation of said impeller, a partition member disposed between and spaced from said end members, blades interconnecting each of said end members with said partition member to define channels between said end members and said blades and said partition member that open radially outwardly and upwardly and downwardly, said casing having passages communicating radially outwardly with said channels between said end members and upwardly with said channels between said upper end member and said partition member, said partition member having upwardly extending openings therethrough to vent the lower of said channels to the upper of said channels, the upper of said end members being of less diameter than the lower of said end members to provide a flow path of recirculation.

3,904,307

GAS GENERATOR TURBINE COOLING SCHEME

William T. Dennison, West Hartford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Apr. 10, 1974, Ser. No. 459,844
Int. Cl.[2] F01D 5/08
U.S. Cl. 415—115 7 Claims



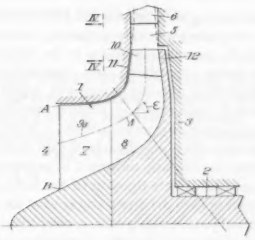
1. A gas turbine construction including two axially spaced independently rotating concentric high and lower pressure turbine rotors, each having a row of blades on its periphery over which the power gas flows in its path through the turbine, a bearing support downstream of the rotors and a bearing for each rotor, a seal on the downstream side of the low pressure rotor, a seal structure extending from said bearing support to the adjacent low pressure rotor with the upstream edge cooperating with the seal on the rotor, said structure defining in cooperation with the rotor a chamber radially inwardly thereof to which cooling air is supplied under pressure, a row of axial passages through the low pressure rotor radially inwardly of the seal for a flow of cooling air from said chamber into the space between the rotors and substantially radial passages in one of said rotors from said space to the blades on said rotor.

3,904,308

SUPERSONIC CENTRIFUGAL COMPRESSORS

Yves Ribaud, Palaiseau, France, assignor to Office Nationale d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon-sous-Bagneux, France

Filed May 13, 1974, Ser. No. 469,500
Claims priority, application France, May 16, 1973, 73.17730
Int. Cl.[2] F04D 21/00, 29/44
U.S. Cl. 415—143 11 Claims



1. A supersonic centrifugal compressor comprising a rotor provided with at least first blades and second blades and with a stationary diffuser surrounding the rotor and carried by a housing having at least one axial fluid inlet, wherein said rotor and housing limit an intake region, a compression region and a radial flow region through which the fluid flows successively and wherein said blades each have a tip portion and a root portion and extend continuously from a leading edge to a trailing edge, the trailing edges of all said blades being located in said radial flow region,

said intake region extending from the leading edges of said first blades to the leading edges of said second blades, said second blades being shorter than the first blades, said first blades having a stag variation in the intake region which is such as to produce a tangential fluid deflection which is small as compared with the tangential flow deflection in the compression region, and having a substantial stag at their leading edges,

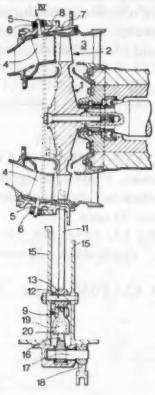
said first and second blades being so shaped in the compression region as to produce the major portion of the tangential flow deflection and azimuthal flow deflection,

and said first and second blades having trailing end portions directed radially with respect to the rotor in said radial flow region.

3,904,309
VARIABLE ANGLE TURBINE NOZZLE ACTUATING MECHANISM

Reginald George Keetley, Solihull, England, assignor to Caterpillar Tractor Company, Peoria, Ill.

Filed Aug. 12, 1974, Ser. No. 496,730
Int. Cl.[2] F01D 17/00, 17/14
U.S. Cl. 415—148 3 Claims



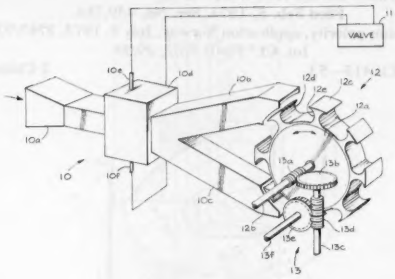
1. A turbine having a variable angle turbine nozzle actuating mechanism comprising a nozzle-actuating member in the form of a substantially complete annulus to be mounted co-axially of nozzle-defining members and operatively connected thereto to effect their angular movement, a pair of links pivotally connected to said nozzle-actuating member at positions thereon spaced apart circumferentially, a lever pivotally connected to the opposite end of each of said links, a support on which said lever is pivotally mounted at position on said lever between the pivotal points thereon of the links, and a pivotally-mounted rocker arm drivingly engaged at its outer end with the lever, whereby on turning said rocker arm, said lever will be swung about its pivot thereby simultaneously to push one said link and to pull other said link to turn said nozzle-actuating member through a corresponding circumferential distance and hence to turn the nozzle-defining members through predetermined angles and to hold them in those angular positions, said lever having means whereby it is slidable on said support in the plane of said lever and the point of engagement of said rocker arm with said lever also having means movable in the plane of said lever, whereby, on temperature change effecting change of length of at least one of said links, said lever will slide with respect to said support and said rocker arm, thereby to permit change of length of the links to be accommodated without effecting any substantial movement of the nozzle-actuating member.

3,904,310
FLUIDIC CONTROL MECHANISM

Gene W. Osheroff, Las Vegas, Nev., assignor to Fluidtech Corporation, Inglewood, Calif.

Filed Dec. 14, 1973, Ser. No. 424,872
Int. Cl. F01d 1/30
U.S. Cl. 415—152 13 Claims

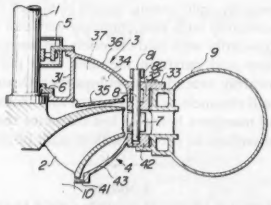
1. A fluidic control mechanism powered by a steady-state fluid stream, said mechanism comprising: a rotatably mounted wheel member having a plurality of double-concave paddles equally spaced along the periphery thereof; and fluidic oscillator means for producing two trains of fluid pulses of variable duration from said fluid stream, said oscillator means including additional means for directing said trains of fluid pulses in a tangential manner against said wheel such that one of said trains of pulses tries to rotate said wheel in a clockwise direction and the other of said trains of pulses tries to rotate said wheel in a counterclockwise direction, the direction of rotation of said wheel at any one time being determined by which of said trains of pulses has the pulses of longer duration at said time.



3,904,311
HYDRAULIC MACHINE

Kazuo Moriguti; Yukio Yamaguchi, and Mutuo Suzuki, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 17, 1973, Ser. No. 389,263
Claims priority, application Japan, Aug. 21, 1972, 47-82763
Int. Cl.[2] F01D 17/14
U.S. Cl. 415—161 3 Claims

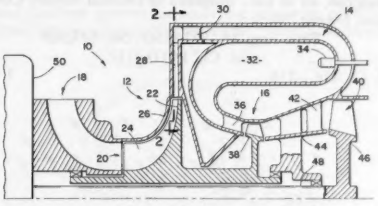


1. A hydraulic machine comprising a main shaft disposed substantially vertically, a runner secured to the lower end of said shaft, a casing for introducing water into said runner, a guide vane provided between an end of said runner and the casing for controlling water supplied into said runner, a stem for operating said guide vane, an upper cover provided in opposition to the upperside of said runner, and a lower cover disposed in opposition to the underside of said runner, said upper cover comprising a columnar portion positioned near the center of the cover and having at its upper part a main shaft guiding bearing and at its lower part a water sealing means, a stem mounting portion positioned between the outer peripheral end of said runner and the casing and arranged such that the section along the runner axis will present a box-like shape, a spherical portion positioned between the upper end of said columnar portion and said stem mounting portion, a plurality of spherical surface reinforcing ribs extending substantially vertically from the inside of said spherical portion and radially from said columnar portion and being formed integral with the inside of said spherical portion, and a baffle plate mounted on said reinforcing ribs between the lower end of said columnar portion and said stem mounting portion and disposed with a predetermined distance from the upper face of said runner.

3,904,312
RADIAL FLOW COMPRESSORS

John T. Exley, Milford, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed June 12, 1974, Ser. No. 478,481
Int. Cl.² F04D 21/00, 29/44
U.S. Cl. 415—181 5 Claims



1. A supersonic radial flow, fluid compressor comprising

an impeller having a hub,

a shroud surrounding said hub and defining, in combination with said hub, an annular flow path of progressively reduced area, which curves outwardly to a circumferential discharge exit between the exit planes of the hub and shroud, which planes are generally normal to the impeller axis,

said impeller having blades projecting from the hub into close proximity with said shroud, for propelling fluid along said flow path and discharging same tangentially from said exit at supersonic velocity

a diffuser encircling said impeller discharge exit and having side walls generally aligned with the planes of said hub and shroud and further including vanes, disposed between said side walls, which define, in combination therewith, a plurality of diffusion channels extending generally tangentially of said discharge exit,

each of said vanes including a wedge portion having a leading edge facing said discharge exit and spaced therefrom to define the outer bounds of a vaneless region of the diffuser, said wedge portion having, on one side, a suction surface facing the impeller axis and a pressure surface on the opposite side thereof, the suction and pressure surfaces of adjacent vanes extending downstream to the throat section of the diffusion channel, characterized in that in each vane

the pressure surface is disposed in a plane parallel to the impellor axis, and

the edge portions of the suction surface, marginally downstream of said leading edge, are more tangential, relative to a radial plane from the impeller axis thereat, at the shroud side of the vane than at the hub side thereof and further that said marginal suction surface portions are generally parallel with the absolute flow angle of the impeller discharge fluid from the hub side to the shroud side of the discharge exit, whereby, across the width of the vane leading edge, there is an essentially uniform angle of incidence, approximating 0°, of the impeller discharge air on the suction surface.

3,904,313
HIGHER HARMONICS HUB VALVE

Henry J. Bernaerts, R.F.D. 10, Box 1610, Annapolis, Md. 21401

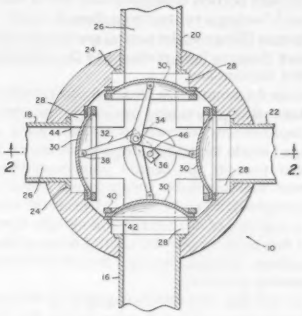
Filed Nov. 5, 1973, Ser. No. 413,110
Int. Cl.² B64C 11/24, 27/72, 15/00, 27/18
U.S. Cl. 416—20 2 Claims

1. A hub assembly for a circulation control rotor comprising:

a hollow drive shaft;

a rotating outer hub member surrounding said hollow drive shaft and having a plurality of fluid outlets therein having radial axes, said rotating outer hub member being connected to said hollow drive shaft to form a fluid passage;

a central shaft;



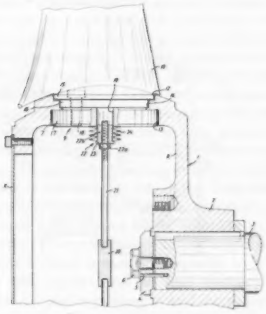
individual movable sealing members connected to each of said fluid outlets aligned with said outlets and movable along their axes; and,

means attached to said central shaft and angularly adjustable about the axis of said central shaft for moving said sealing members sequentially at a plurality of superimposed frequencies during opening.

3,904,314
IMPELLER WHEEL FOR AN AXIAL FLOW FAN

Henry Valdemar Pedersen, Haslev, Denmark, assignor to Nordisk Ventilator Co. A/S, Naestved, Denmark

Filed Dec. 27, 1973, Ser. No. 429,015
Int. Cl.² F04D 29/36
U.S. Cl. 416—135 1 Claim



1. In an impeller wheel for an axial flow fan, having

a hollow impeller hub with a central bore for the shaft of a fan driving motor and a plurality of circumferentially spaced apertures extending between the outer and inner surfaces of the hub at right angles to the axis of the central bore, each of said apertures being formed with outer and inner counterbored portions at the outer and inner surfaces of the hub, respectively, and a central portion of restricted cross-sectional area between said counterbored portions;

a plurality of vanes, each of which is formed with a disc-shaped base portion having a cross-sectional area exceeding the restricted cross-sectional area of the central portion of each aperture, said base portion being inserted in

the outer counterbored portion of an individual one of said apertures;

a plurality of flat and disc-shaped retaining members having a cross-sectional area exceeding the restricted cross-sectional area of the central portion of each aperture, each of said retaining members being inserted in the inner counterbore portion of an individual one of said apertures and each having a central bore therethrough;

spacer means filling out the central portion of each aperture between the vane base portion and the retaining member inserted therein; and

bolt means for connecting the vane base portion in each aperture with the retaining member in the same aperture; the improvement wherein adjustable spring means are arranged inside the hollow hub for biasing each retaining member towards the central portion of its associated aperture, said adjustable spring means comprising:

a. a central hub member arranged inside the impeller hub;

b. a plurality of arms extending radially from said central hub member into the central bores of the retaining members, each arm having a threaded end adjacent the retaining members;

c. a nut member threadingly engaged on the threaded end of each arm, said nut member having the radially outward end of a diameter smaller than that of the central bore of the retaining member and an enlarged collar portion on the other end; and

d. a spring disposed between said enlarged collar portion of said nut member and said retaining member.

3,904,315

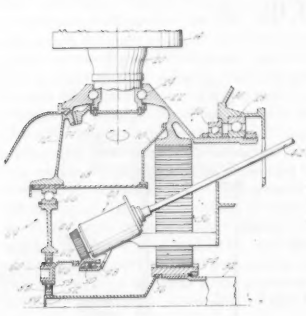
PITCH CHANGE SIGNAL MEANS WITH DIFFERENTIAL GEARING

Robert A. Schwartz, Vernon, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

Filed July 31, 1974, Ser. No. 493,933

Int. Cl.[2] B64C *11/32*

U.S. Cl. 416—160 **5 Claims**



1. For a fan or propeller having variable pitch blades and means including a gearbox having a train of gears for reducing the speed of the fan or propeller from its driving means, pitch change means including a rotary actuator for changing the blade angle of the blades, the improvement comprising a differential gear set operatively connected to said rotary actuator consisting of a sun gear, one set of planetary gears and a ring gear connected to said rotary actuator, said sun gear being grounded to a rotating member of said gearbox, said differential gear set having the same gear ratio as the ratio of the train of gears of said gearbox, a cage supporting said set of planetary gears and movable to add to or substract from the rotational speed of said ring gear, means interconnecting said blades and said rotary actuator for imparting pitch change movement in response to said added or substracted speed, and means for imparting movement to said cage in accordance with a desired blade angle.

3,904,316

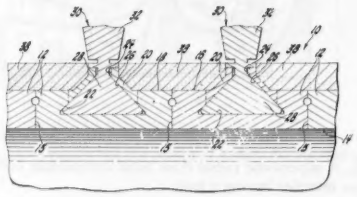
TURBINE ROTOR WITH SLOT LOADED BLADES AND COMPOSITE BANDS

David L. Clingman, Carmel; Berton Schechter, Indianapolis; Marvin Herman, Indianapolis, and George R. Sippel, Indianapolis, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 16, 1974, Ser. No. 497,869

Int. Cl.[2] F01D *5/32*

U.S. Cl. 416—218 **1 Claim**



1. A turbine rotor assembly comprising, in combination:

a plurality of annular members joined together in axial alignment, each annular member having a blade retention slot extending circumferentially around the outer surface thereof and a blade loading notch for inserting turbine blades in the blade retention slot;

a circumferential row of turbine blades projecting radially outward from each annular member, each turbine blade having a base portion retained in the blade retention slot; one or more filler members inserted in each blade loading notch radially outward of the adjacent turbine blade base portion, each filler member having a surface continuing the surface of the annular member across the loading notch;

a circumferential band of composite fibrous material encircling the annular members between each adjacent pair of turbine blade rows, the bands being supported across the blade loading notches by the filler members, the bands including circumferentially extending fibers and being adapted to be loaded in circumferential tension by the radial expansion of the annular members, whereupon such radial expansion is restricted and the blades are retained securely in the blade retention slots.

3,904,317

BUCKET LOCKING MECHANISM

Robert A. Cardin, Schenectady, and Kenneth P. Zeman, Burnt Hills, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 27, 1974, Ser. No. 527,586

Int. Cl.[2] F01D *5/32*

U.S. Cl. 416—220 **5 Claims**

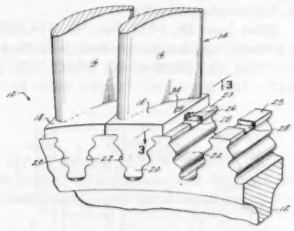
1. In a turbomachine of the type including a rotatable disc formed with at least one slot extending generally axially of said disc at its periphery, a blade extending generally radially from said disc and having a root portion engaged in said axial slot and a platform portion, extending over a portion of the periphery of said disc, said axial slot and said root portion sized and formed to abut and radially lock the blade to the disc against centrifugal forces, means for axially retaining said blade root in said axial slot comprising:

a locking key having a block portion and an elongated stem portion extending therefrom and terminating at a distal end;

said block portion having a thickness defined by radially inwardly and outwardly facing surfaces, a width, and a length of greater extent than said width, said stem extend-

ing normally from a central position of said radially outwardly facing block surface;

said platform portion formed with a circumferentially extending slot in its radially inner side, said platform slot having an axial width sized to receive the width dimension of said block in close fitting relationship thereto and having a radial height sized to receive said block in noninterfering relation with said disc, a radial opening formed through said platform portion and communicating with said platform groove for receiving said stem portion, in close fitting relationship therewith, when said block is



engaged in said platform groove and for providing access to the distal end of said stem;

a circumferential slot formed in the periphery of said disc adjacent said axial slot, said disc circumferential slot having an axial length sized to receive the length dimension of said block in close fitting relationship therewith, said disc circumferential slot located and having a radial depth such that when said blade is inserted into said axial disc slot, said locking block may be dropped radially out of engagement with said platform slot and into engagement with said disc peripherial slot and then rotated to axially lock the blade in the axial disc slot.

3,904,318

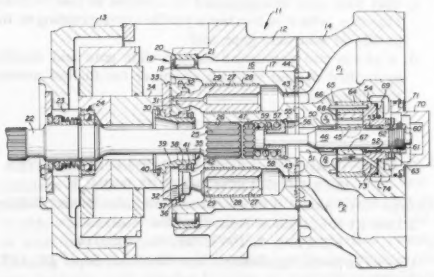
FLUID ENERGY TRANSLATING DEVICE

Ellis H. Born, and Alan H. Viles, both of Columbus, Ohio, assignors to Abex Corporation, New York, N.Y.

Filed Aug. 2, 1974, Ser. No. 494,696

Int. Cl.[2] F04D *13/12*

U.S. Cl. 417—199 **16 Claims**



1. In a fluid energy translating device having a housing, a barrel rotatably supported in the housing, a plurality of cylinders in the barrel, a piston mounted for reciprocation in each cylinder, a main drive shaft drivingly connected to the barrel, a surface containing inlet and outlet porting to receive and exhaust fluid to and from said barrel in the housing at one end of the barrel, means for reciprocating the pistons within the cylinders when the barrel is rotated, the improvement comprising: a fixed displacement servo pump, a second shaft to drive said servo pump when said barrel is rotated, a second surface containing inlet and outlet ports in the housing for receiving and exhausting fluid to and from said servo pump, and spring means acting between said second shaft and said barrel for simultaneously biasing said barrel against the first surface and the servo pump against said second surface.

3,904,319

CENTRIFUGAL PUMPS

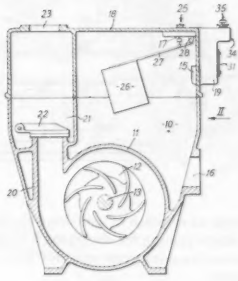
Harold Philip Sidney Paish, and Henry Smith, both of London, England, assignors to Sykes Pumps Limited, London, England

Filed Mar. 6, 1974, Ser. No. 448,752

Claims priority, application United Kingdom, Mar. 6, 1973, 10923/73

Int. Cl.[2] F04D *9/00*

U.S. Cl. 417—200 **8 Claims**



1. A centrifugal liquid pump of the type wherein an auxiliary vacuum source assists in priming and removing unwanted gas during operation thereof, the centrifugal pump comprising a primary chamber which contains liquid and receives unwanted gas which has entered the pump; an upper port in said primary chamber in communication with said vacuum source for removal of gas from said primary chamber; float-operated valve means which control said upper port; means defining a secondary chamber having upper and lower parts, said upper part being disposed between and in communication with said port and said vacuum source; a return passageway extending from said lower part of the secondary chamber to said primary chamber; second valve means in said return passageway operable to permit liquid flow from said secondary chamber to said primary chamber when the pressure in said secondary chamber is greater than that in said primary chamber; said secondary chamber having an upper opening in communication with said vacuum source and through which gas from said primary chamber is extracted via said port and the secondary chamber; said float-operated valve means being operable to open said secondary chamber to atmosphere when said port is closed by said float-operated valve means in response to a predetermined rise in the liquid level in said primary chamber; whereby entrained liquid deposited in said secondary chamber is discharged to said primary chamber through said return passageway as a result of the pressure differential which occurs between the primary and secondary chambers when said secondary chamber is opened to atmosphere.

3,904,320

SWASH PLATE COMPRESSOR

Atsuo Kishi, and Takashi Degawa, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed May 8, 1973, Ser. No. 358,334

Claims priority, application Japan, May 10, 1972, 47-45445

Int. Cl. F04b *27/08*

U.S. Cl. 417—269 **16 Claims**

1. A swash plate type compressor comprising:

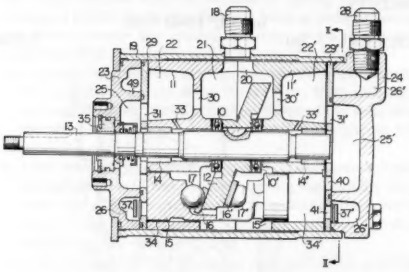
a casing,

a pair of cylinder blocks disposed immediately adjacent one another at a separation plane in said casing,

a drive shaft rotatably supported by said cylinder blocks for rotation about an axis extending transverse to said separation plane,

a swash plate rotatable with said drive shaft and disposed in a crankcase formed by facing portions of said cylinder blocks, bearing means for rotatably supporting said drive shaft and swash plate being disposed in said crankcase,

cylinder bores formed in said cylinder blocks for accommodating axial sliding movement of pistons disposed therein



in response to rotation of said drive shaft and swash plate, and an inlet opening for supplying a fluid medium to said compressor for compression within said cylinder bores by said pistons,

wherein said inlet opening extends from outside said casing directly into said crankcase at said separation plane so that lubricant contained in said fluid medium is supplied directly to said bearings, said inlet opening being formed by facing portions of said cylinder blocks, said facing portions extending from immediately adjacent said casing so as to direct said fluid medium and lubricant directly radially inwardly from said casing to said crankcase and bearing means.

3,904,321

FEEDBACK PRESSURE RESPONSIVE CONTROL VALVE FOR A ROTARY PISTON COMPRESSOR

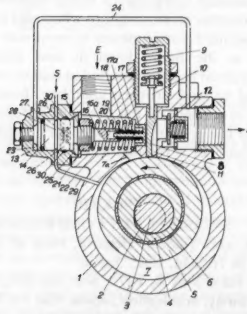
Joseph Rüedi, Birchwil, Switzerland; Oskar Vielmo, Sulzburg, Germany, and Franz Weinhandl, Effretikon, Switzerland, assignors to Nova-Werke AG, Effretikon, Illnau, Switzerland

Filed Mar. 27, 1974, Ser. No. 455,465

Claims priority, application Switzerland, Mar. 29, 1973, 4541/73

Int. Cl.[2] **F04B** *49/00;* **F01C** *1/02;* **F04C** *17/02;* **F01C** *21/04*

U.S. Cl. 417—283 **6 Claims**



1. In a rotary piston compressor having a piston located eccentrically with respect to its drive shaft and a stop slide pressed by at least one spring against the piston, the improvement comprising: a housing, a retaining piston adapted to hold said stop slide in its top compression point, a control piston in said housing adapted to actuate said retaining piston into its retaining position, a first spring urging said control piston away from said retaining piston and, a source of feed pressure to move said control piston against the force of said first spring whereby said retaining piston is moved into its retaining position.

3,904,322

SCREW COMPRESSOR

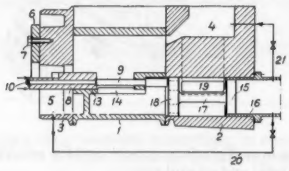
Rolf Axelsson, Norrkoping, Sweden, assignor to Stal Refrigeration AB, Norrkoping, Sweden

Filed June 28, 1973, Ser. No. 374,500

Claims priority, application Sweden, June 30, 1972, 8645/72

Int. Cl.[2] **F04B** *49/00;* **F01C** *1/16*

U.S. Cl. 417—310 **7 Claims**



1. A capacity control valve for a screw compressor having two intersecting bores defining a working chamber in which a pair of intermeshing helical screws rotate to compress and entrap a working fluid passed from an inlet wall to an outlet wall in said working chamber, said control valve comprising:

a. a slide gate comprising a portion of the wall of said working chamber and being axially displaceable to regulate an opening for venting working fluid from the bottom of the working chamber;

b. said slide gate in cross section defining a triangular profile the base of which describes a convex shallow arc with its center located on a line of symmetry between the two helical screws and the two sides thereof describing two shallow concave arcs conforming to the peripheral contour of the helical screws, each of said arcs defining a curvature of less than 90° to form a substantially flat triangular member;

c. said slide gate being guided in a recess in said working chamber, which recess has a profile corresponding to the profile of said slide gate; and

d. a piston rod connected to said slide gate and slidably journalled in said working chamber for further guiding the slide gate.

3,904,323

WATER TURBINES AND/OR PUMPING APPARATUS INCORPORATING SAID TURBINES

George Roy Martin, 6 Bowler Ave., and John Robert Botting, 2 District Rd., both of Dunedin, New Zealand

Filed Oct. 1, 1973, Ser. No. 402,014

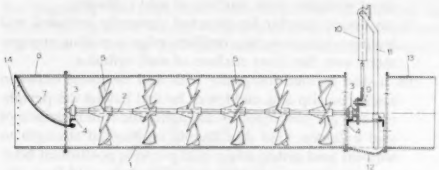
Claims priority, application New Zealand, Sept. 29, 1972, 168,546

Int. Cl.[2] **F04B** *17/00;* **F03D** *7/00*

U.S. Cl. 417—334 **6 Claims**

1. A water turbine comprising a generally, horizontally disposed casing through which water may pass, a longitudinal shaft rotatably mounted within said casing, a plurality of multi-bladed propellers mounted on said shaft at intervals along said shaft with the spacing sufficient to allow the flow of water to re-establish after passing each propeller, and flow control means to control the amount of water passing into said casing and past said multi-bladed propellers so that in use only part of the multi-bladed propeller is in the water flow, the flow

control means comprising an upstream guide member in the casing defining a nozzle that directs the flow of water toward



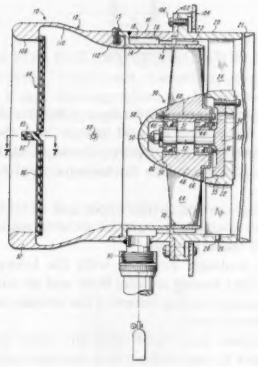
the propellors below the longitudinal shaft so that half or less of the propeller blades are successively submerged in the limited flow of water through the casing.

3,904,324

TIP TURBINE INFLATING DEVICE

Joseph Flatt; Robert C. LoPiccolo, and Eugene Linsker, all of Dayton, Ohio, assignors to Tech Development Inc., Dayton, Ohio

Filed Nov. 6, 1972, Ser. No. 304,095
Int. Cl. F04b *17/00, 35/00;* **B63c** *7/16*
U.S. Cl. 417—355 **12 Claims**



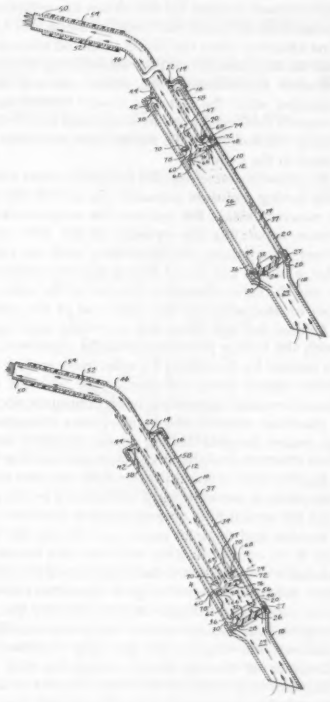
1. A tip turbine type unit having particular advantage for inflation purposes including a tubular housing comprised of connected ring-like segments one of which enbodies therein a double walled portion forming a chamber for gaseous fluid in at least one wall portion of which are embodied passages forming turbine nozzles within said tubular housing, a rotor unit bridging said tubular housing to provide outer bladed portions thereof in the path of discharge from said nozzles, means bridging said tubular housing providing a base for mounting said rotor unit within said housing, a spindle unit, said base and said spindle unit having a male-female connection to mount said spindle unit, said spindle unit mounting bearing means having mounted thereabout a hub portion of said rotor unit, said hub portion having peripherally projected blade means and means mounting to either end of said rotor hub portion and interconnected therewith to contain said bearing means and said spindle and mount said rotor unit to said base.

3,904,325

EXPELLER PUMP

Sigfrid M. Olofsson, Munkedal, Sweden, and Chester H. Wickenberg, Elgin, Ill., assignors to UPD Industries, Inc., Chicago, Ill.

Filed Feb. 22, 1974, Ser. No. 444,850
Int. Cl.² F04B *7/00, 21/04*
U.S. Cl. 417—512 **20 Claims**



1. A double acting expeller pump, comprising:

an elongated hollow cylinder having a closure adjacent one end of the cylinder, with said closure having a bore extending therethrough;

inlet means communicating with the inside of the other end of the cylinder;

passage means communicating between the inlet means and the inside of the cylinder;

a piston received inside the cylinder for reciprocation therein, said piston separating at least a portion of the inside of the cylinder into a first cnamber intermediate the piston and the other end of the cylinder and a second chamber intermediate the piston and said closure;

a hollow piston rod slidably received in the closure bore, said piston rod having one end connected to said piston and the other end extending out of the cylinder;

a base member located adjacent the other end of the cylinder, said base member being spaced from the inside of the cylinder, with the spacing between the base member and the cylinder defining said passage means;

a screen extending between the base member and the inner wall of the cylinder to support the base member and to

filter debris from fluid passing from the inlet means to the inside of the cylinder;

gate means for establishing communication between the first chamber and the inlet means and closing the second chamber from communication with the inlet means when the piston is moved toward said closure by the piston rod, and for establishing communication between the second chamber from communication with the inlet means and the inlet means and closing the first chamber when the piston is moved toward the other end of the cylinder; and valve means carried by the piston for establishing communication between the inside of the piston rod and the first chamber when the piston is moved towards the other end of the cylinder, and for establishing communication between the inside of the piston rod and the second chamber when the piston is moved toward said closure, whereby fluid is pumped from the inlet means through the piston rod and out of the pump when the piston is reciprocated in the cylinder.

18. In a double acting expeller pump provided with a hollow cylinder having a closure adjacent one end of the cylinder, a piston received inside the cylinder for reciprocation therein, the piston separating the cylinder in the first and second chambers, inlet means communicating with the inside of the cylinder, a hollow piston rod having one end connected to the piston and the other end extending out of the cylinder, a base member located adjacent the other end of the cylinder, passages formed through the piston providing open communication with the hollow piston rod and the chambers, and valve means carried by the piston for selectively sealing one of the chambers against open communication with the piston rod and simultaneously permitting open communication with the other chamber, wherein the improvement comprises:

gate means for establishing communication between the first chamber and the inlet means and closing the second chamber from communication with the inlet means when the piston is moved toward said closure by the piston rod, and for establishing communication between the second chamber and the inlet means and closing the first chamber from communication with the inlet means when the piston is moved toward the other end of the cylinder; and said gate means comprising an elgonated tubular section received in said cylinder and surrounding the piston, the length of the tubular section being less than the distance between the closure and the base member, the outer diameter of tubular section being less than the inside diameter of the cylinder to define channel means between the tubular section and the cylinder, said tubular section being movable responsive to the movement of the piston between a first position with one end of the tubular section engaged against the base member and the other end of the section spaced from the closure, and a second position with the other end of the tubular section engaged against the closure and the one end of the section spaced from the base member.

3,904,326
MULTI-PURPOSE PUMP

Clyde H. Clement, Phoenix, Ariz., assignor to Phoenix Pump Company, Phoenix, Ariz.

Continuation-in-part of Ser. No. 143,430, May 14, 1971, abandoned, which is a continuation-in-part of Ser. No. 885,028, Dec. 15, 1969, abandoned. This application Aug. 13, 1973, Ser. No. 387,666

Int. Cl. F04b *21/04*

U.S. Cl. 417—571 **1 Claim**

1. A multi-purpose pump for liquid and gaseous fluids, comprising in combination:

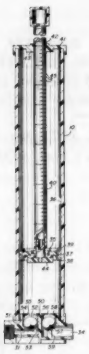
a. a hollow, elongate cylinder having an upper end and a lower end;

b. a piston fabricated from a thermoplastic material disposed transversely within said cylinder for reciprocal movement therewithin between positions proximate said upper and lower ends of said cylinder, said piston including

i. a lower annular lip directed downwardly outward and having a relatively thin resilient edge in sealing engagement with the inner surface of said cylinder,

ii. an upper annular lip directed upwardly outward and having a relatively thin resilient edge in sealing engagement with the inner surface of said cylinder,

iii. a disc formed integrally with and disposed between said upper lip and said lower lip and having the periphery thereof continuously engaging the inner surface of said cylinder, said disc having substantial strength to support said piston when said pump is positioned horizontally for storage thereby preventing cold-flow distortion to said upper and lower lips;



c. an elongate piston operating rod having the lower end thereof connected to said piston and the upper end thereof spaced above the upper end of said cylinder;

d. a handle connected to the upper end of said operating ord;

e. an end cap carried by the upper end of said cylinder and having an aperture therein for slidably guiding said operating rod therethrough;

f. a block sealingly engaged with the lower end of said cylinder and having an inlet bore and an outlet bore, said bores communicating between the interior and exterior of said cylinder; and

g. valve means associated with said inlet bores and said outlet bore to permit fluid flow through said inlet bore in response to upward movement of said piston and to permit fluid flow through said outlet bore in response to downward movement of said piston.

3,904,327
ROTARY COMPRESSOR-EXPANDER HAVING SPRING BIASED VANES

Thomas C. Edwards, Casselberry, Fla., and Claude Edwards, Espanola, N. Mex., assignors to The Rovac Corporation, Maitland, Fla.

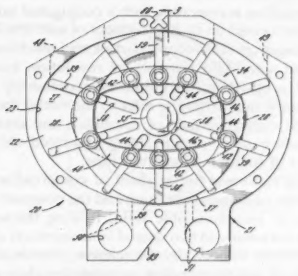
Continuation-in-part of Ser. No. 197,312, Nov. 10, 1971, abandoned. This application Sept. 26, 1973, Ser. No. 400,965

Int. Cl.[2] F01C *1/00;* **F04C** *17/00;* **F01C** *21/00;* **F04C** *29/00*

U.S. Cl. 418—8 **28 Claims**

1. A rotary unitary compressor-expander for use in a refrigeration device comprising in combination, a stator including a hollow member enclosed by respective end members defining a chamber having a wall of oval cross section, a rotor rotatably mounted in axial position in the stator chamber, the rotor having a plurality of equally spaced radial vane slots, a plurality of vanes snugly slideable in the respective vane slots,

each of said vanes having a base portion and having a radially presented vane tip, the base portion having aligned axially extending stubshafts fitted with cam followers, a continuous inwardly facing cam track at each end of the stator chamber for engaging the respective cam followers on each of the vanes, spring band biasing means operatively associated with the vanes for urging the vanes radially outwardly to keep the



cam followers thereon biased against the cam tracks, said cam tracks being of oval configuration geometrically synchronized to the oval wall of the chamber so that the tips of said vanes are maintained in continuous clearance sealing engagement with the wall, the cam tracks serving to resist the biasing force and to positively retract the vanes inwardly during portion of the rotational cycle thereby to avoid crowding, with resultant wear and friction at the tips of the vanes.

3,904,328

ROTOR FOR ROTARY COMBUSTION ENGINE

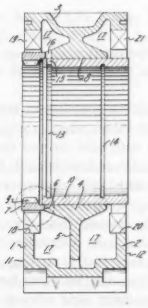
Gottlieb Wilmers, Neckarsulm, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft, Neckarsulm and Wankel G.m.b.H., Lindau, both of Germany

Division of Ser. No. 302,048, Oct. 30, 1972, Pat. No. 3,829,944. This application May 15, 1974, Ser. No. 470,268

Claims priority, application Germany, Nov. 16, 1971, 2156814

Int. Cl.² F02B *53/00*

U.S. Cl. 418—61 A **2 Claims**



1. A hollow rotor for rotary engine of trochoidal type, the rotor being formed of lightweight metal and comprising a pair of parallel side walls, a peripheral wall spacing the side walls apart and integral therewith, an internal hub integrally attached to the peripheral wall and having a bore therethrough, the hub having an axial length less than the spacing between the inner surfaces of the side walls, each side wall having a circular opening therethrough providing access to the interior of the rotor, the side wall openings being of greater diameter than the outer diameter of the hub and coaxial therewith, and an internally toothed ring gear formed of steel metallurgically attached to one axial end face of the hub and coaxial therewith, the teeth of the ring gear having a root circle diameter less than the inner diameter of the hub bore, the outer diameter of the ring gear being no greater than the outer diameter of the hub end face to allow access to the interior of the rotor, the ring gear extending axially beyond the outer face of the adjacent side wall.

3,904,329

ROTARY PISTON COMBUSTION ENGINE OF TROCHOID TYPE

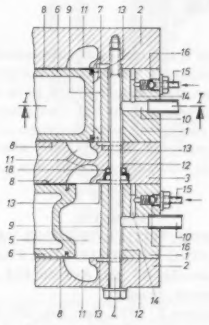
Johannes Steinwart, Bad Friedrichshall, Germany, assignor to Audi NSU Auto Union Aktiengesellschaft and Wankel GmbH, Germany

Filed Mar. 18, 1974, Ser. No. 451,770

Claims priority, application Germany, Mar. 22, 1973, 2314251

Int. Cl.² F01C *21/04*

U.S. Cl. 418—99 **7 Claims**



1. A rotary piston combustion engine of trochoid type having a housing composed of at least one shell and at least two parallel end parts and comprising an inlet passage provided with a throttle and an outlet passage, each shell being arranged between two end parts and being connected thereto to bound an interior space, a multi-apex piston rotatably arranged in the space and provided with sealing members sliding along the inner surfaces of the housing, an air passage communicating with the atmosphere at one end and opening into the intake chamber near the inlet passage at the other end, an air throttling means arranged within said air passage and coupled with the throttle, which means affords a small flow cross section when the throttle is closed, and a progressively enlarging flow cross-section as the throttle progressively opens, and lubricant supply means including a lubricant supply passage opening into said air passage for providing lubrication of said inner surfaces.

3,904,330

LUBRICATING SYSTEM FOR ROTARY INTERNAL COMBUSTION ENGINE

Russell J. Van Rens, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

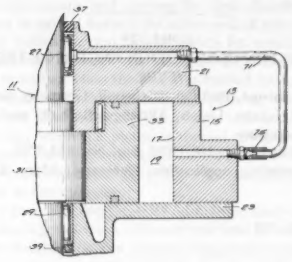
Filed Feb. 20, 1974, Ser. No. 444,042

Int. Cl.²,F01C *21/04*

U.S. Cl. 418—100 **7 Claims**

1. A rotary internal combustion engine comprising a housing assembly defining a rotor cavity including a peripheral wall and an inlet for admitting a fuel-lubricant mixture into said rotor cavity, a rotor including a plurality of apex portions, means located on said housing assembly and supporting said rotor for rotation in said cavity with said apex portions in engagement with said peripheral wall so as to create in said cavity and in response to rotor rotation a substantially sealed

moving chamber which, during one portion of the rotor rotational cycle, increases in volume so as to provide inflow of fuel-lubricant mixture into said chamber, which, during a second portion of the rotor rotational cycle subsequent to the first cycle portion, decreases in volume to compress the fuel-lubricant mixture in said chamber, and which, during a third



portion of the rotor rotational cycle subsequent to the second cycle portion, increases in volume in response to fuel ignition in said chamber, an area on said engine to be lubricated, and means operable in response to the compression of the fuel-lubricant mixture during the second portion of the rotor rotational cycle for pumping fuel-lubricant mixture from said moving chamber in said cavity to said area to be lubricated.

3,904,331

ROTARY MACHINE WITH ROTATING VANE WHEELS CIRCULATING IN SPIRAL-LIKE PASSAGES

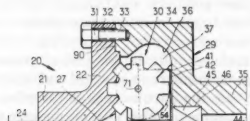
Eugeniusz M. Rylewski, 43 bis, Ave du Gal Leclerc, 78-St-Remy-les-Chevreuse, France

Filed June 2, 1972, Ser. No. 259,213

Claims priority, application France, June 3, 1971, 71.20194; June 3, 1971, 71.20195; June 3, 1971, 71.20196

Int. Cl. F01c *1/00;* **F03c** *3/00;* **F04c** *1/00*

U.S. Cl. 418—111 **22 Claims**



1. A positive-displacement machine in which the conversion of pressure energy of fluids is obtained by the circulation of at least two spaced vane members in at least one spiral-like passage of revolution defined by a pair of rib members having top surfaces and side walls, wherein

said vane members are parts of at least two vane wheels,

each of said vane wheels being mounted for rotation about its own axis and housed in a slot formed in a first part of said machine,

said vane members circulating in said spiral-like passages of revolution formed in a second part of said machine.

at least one of said first and second parts of said machine is rotatable, the axis of rotation thereof constituting the main axis of rotation of said machine,

said spiral-like passages of revolution being generated by a combined rotation of said vane members about the axis of rotation of their respective vane wheels and by rotation of said first part of said machine in relation to said second part of said machine,

said spiral-like passages being closed across the top of said side walls by a curved surface of revolution formed on said first part of said machine receiving said vane wheels, said curved surface of revolution formed on said first part of said machine cooperating with a conjugated surface of revolution formed on the top surfaces of said ribs defining said passages on said second part of said machine,

said defined spiral-like passages of revolution having an inlet and an outlet and a continuous progressively varying crossectional area from the inlet to the outlet thereof,

each of said curved surface of revolution and said conjugated surface of revolution being generated about said main axis of rotation of said machine,

whereby the ratio and the gradient of compression or expansion for a compressible fluid, and the constant volume flow for an incompressible fluid, flowing through said passages between said two spaced vane members circulating therein are imposed by the relative position and configuration of said cooperating conjugated surface of revolution to said curved surface of revolution generated by the rotation of said vane members aabout said main axis, of said machine and by the difference of the distances of said vane members from said main axis of said machine during their travel from the inlet to the outlet of said spiral-like passages.

3,904,332

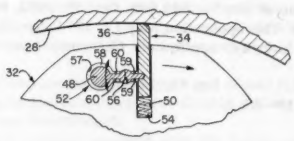
SEAL FOR ROTARY DEVICE

Roy L. Clough, Jr., 1 N. Curtisville Rd., Concord, N.H. 03301

Filed Mar. 14, 1974, Ser. No. 451,098

Int. Cl.² F01C *19/02*

U.S. Cl. 418—115 **1 Claim**



1. A rotary engine comprising:

a housing having an internal chamber defined by a curved surface;

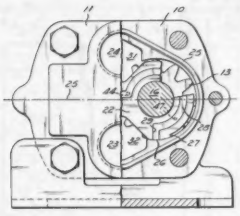
a rotor unit mounted for rotation in said chamber and having a plurality of lobes which move with said rotor in follower relation with said curved surface; and

a sealing means associated with each lobe for providing a sealing contact with said curved surface, said sealing means comprising a first slot in a lobe of said motor extending radially inward from the apex of said lobe, a second slot in said lobe extending at an angle to and intersecting said first slot, a sealing member disposed in said first slot, said sealing member having an edge surface which slidably contacts said curved surface and a third slot in one side thereof, spring means in said first slot for biasing said first member against said curved surface, a second member disposed in said second slot, said second member having a lip at one end which loosely extends into said third slot and pivotally couples said second member to said first member, said second slot and said second member having cooperating means for providing a pivot for said second member intermediate the ends of said second member, and a counterweight affixed to the opposite end of said second member in counterbalancing relation to said first member.

3,904,333
PRESSURE BALANCING SYSTEM FOR GEAR PUMPS OR MOTORS

Ulrich W. Stoeckelmann, Mansfield, Ohio, assignor to The Weatherhead Company, Cleveland, Ohio

Filed May 22, 1974, Ser. No. 472,371
Int. Cl.[2] F04C *15/00*
U.S. Cl. 418—132 **14 Claims**



1. A hydraulic pump, motor or the like comprising a housing assembly providing a gear chamber with high and low pressure ports communicating therewith at spaced locations, a pair of meshing gears in said chamber, a pressure plate adjacent each end of said gears, each pressure plate providing a seal face sealing with the adjacent end of said gears and a pressure force opposite said seal face, said gears when rotating entrapping and pressurizing liquid in a zone where the gears intermesh, pressure seal means in each pressure face operating when pressurized to produce a force urging the associated pressure plates toward sealing engagement with said gears, said seal means dividing said pressure faces into low pressure zones in communication with said low pressure port and high pressure zones in communication with said high pressure port, first passage means connected to supply entrapped liquid to pressurize said seal means, and second passage means smaller than said first passage means connecting one of said pressure zones and seal means for flow in both directions therebetween.

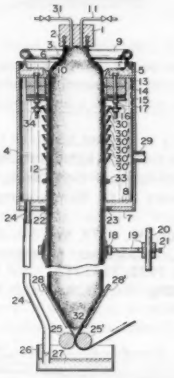
3,904,334
APPARATUS FOR SHAPING TUBULAR FILM

Masahide Yazawa, and Tokio Okada, both of Tokyo, Japan, assignors to Polymer Processing Research Institute Ltd., Tokyo, Japan

Continuation of Ser. No. 143,312, May 14, 1971, abandoned. This application Dec. 3, 1973, Ser. No. 420,996
Claims priority, application Japan, June 8, 1970, 45-49310
Int. Cl. B29d *7/20*
U.S. Cl. 425—71 **2 Claims**

1. An apparatus for supporting, calibrating and coagulating a tubular film during a downward film blowing process comprising

a. an extruding means for thermoplastic polymer including an annular die that has an extruding slit,
b. a feeding pipe for pressurized air that is to inflate the extrudate into a tubular film,
c. a coagulant distributing means located concentrically below said extruding slit and including a coagulant distributing vessel and piping for suppling coagulant,
d. a taking up means for said tubular film,
e. a flexible cylindrical net which concentrically surrounds said tubular film for a substantial part of its inflated length,
f. a cylindrical passageway beneath said annular die which has a size and shape to accommodate the downward passage of the tubular film in its inflated condition,
g. the upper end of said flexible cylindrical net being suspended from said passageway beneath said coagulant distributing means,
h. the lower end of said net facing said taking up means and being fixed to a ring member provided with a stretching means for said net which is capable of adjusting the diameter of said net to the approximate diameter of said inflated tubular form,
i. a reduced pressure chamber with exhaust piping means, said chamber extending beneath said coagulant distributing means and surrounding both said inflated tubular film and said flexible cylindrical net,
j. the upper portion of said cylindrical passageway that is adjacent to the point where the coagulant liquid first contacts the top of said net being composed of at least two ring members that concentrically surround said inflated tubular film and are vertically stacked upon one another in a coaxial manner,



k. the inside walls of said ring members being provided with a plurality of grooves that are each inclined with respect to a plane through the circumference of the ring member,
l. the inside walls of said ring members also each being provided with a groove around the internal circumference and which is positioned adjacent one internal edge portion, whereby stacked ring members present a downward flow path that permits the coagulant to flow down uniformly between the inner walls of the ring members and the other wall of the tubular film,
m. a sealing device furnished on the periphery of the lower opening of the reduced pressure chamber through which the tubular film enveloped in the net passes, and
n. a passgeway for discharging surplus coagulant that collects in the bottom of the reduced pressure chamber.

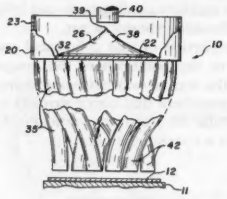
3,904,335
APPARATUS FOR FELTING WAFERS IN WAFERBOARD PRODUCTION

William L. Watkins, Hudson Bay, Canada, assignor to MacMillan Bloedel Limited, Vancouver, Canada

Division of Ser. No. 318,739, Dec. 27, 1972, Pat. No. 3,851,031. This application July 26, 1974, Ser. No. 492,020
Claims priority, application Canada, Nov. 24, 1972, 157385
Int. Cl.[2] B29J *5/00*
U.S. Cl. 425—80 **7 Claims**

1. Apparatus for felting wood wafers in production of waferboards comprising a container having a peripheral wall, a cone mounted for rotation in the container centrally thereof, power means for spinning the cone, means for directing a stream of wood wafers on to the cone, conveying means for moving supporting plates along a path spaced below said container, and a plurality of tubes having upper ends opening into the container and arranged around the cone, said tubes extending downwardly without extreme bends to lower ends located immediately above the supporting plates moving along the path, said lower ends being arranged side by side in rows

extending transversely of said path and across the width of the supporting plates, said tubes distributing the wafers evenly on



to the moving plates across the width thereof to form thereon felted mats of uniform predetermined thickness.

3,904,336

APPARATUS FOR MAKING PRESSED BOARD

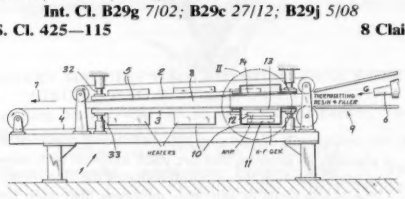
Heinrich Axer, Nettetal, and Gerd Roth, Kevelaer, both of Germany, assignors to G. Siempelkamp & Co., Krefeld, Germany

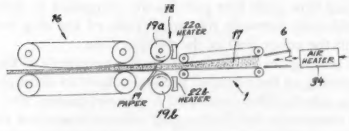
Filed July 30, 1973, Ser. No. 383,730

Claims priority, application Germany, Aug. 1, 1972, 2237755; Nov. 14, 1972, 2255712

Int. Cl. B29g *7/02;* **B29c** *27/12;* **B29j** *5/08*

U.S. Cl. 425—115 **8 Claims**





1. In an apparatus for making pressed board from thermosetting resinous material and filler, in combination:

a pair of perforated, endless conveyor bands with generally horizontal, relatively inclined confronting surfaces forming a converging throat between them;

nozzle means adjacent said conveyor bands for continuously blowing a substantially horizontal stream of thermosetting resinous material and filler entrained by a carrier fluid into said throat from the broad end thereof;

heating means at said throat for at least partly setting said resinous material during compaction of the mixture between said conveyor bands into a continuous and coherent web;

a continuously operating press adjoining said conveyor bands at the narrow end of said throat for receiving said web therefrom and further compacting same with final setting of said resinous material; and

a finishing stage inserted between said conveyor bands and said press, said finishing stage being provided with supplemental heating means for at least maintaining the temperature of the web issuing from said throat.

3,904,337

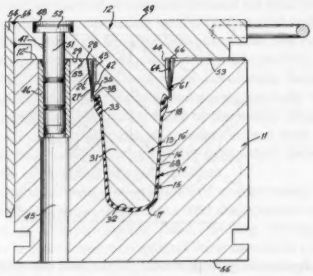
APPARATUS FOR MOLDING BLADDERS

Jacques H. Mercier, 49 rue de Naples, Paris, France

Filed July 21, 1971, Ser. No. 164,708

Int. Cl.[2] **B29D** *3/02;* **B29H** *7/00;* **B29C** *3/00*

U.S. Cl. 425—128 **6 Claims**



1. A mold for forming bladders of the type having an enlarged diameter mouth with an annular supporting member having a mounting portion at its lower edge to which the mouth of the bladder is secured, a portion extending transversely outwardly from the mounting portion and a retaining portion rising from the outer periphery of such transverse portion, said mold comprising a base member having an elongated recess therein and a cover having a core member associated therewith and adapted to be moved into said recess, said core member and said recess defining an annular cavity therebetween when juxtaposed, conforming to the shape of the bladder to be formed, said recess having a mouth exposed in the top surface of the base member, said recess having an enlarged diameter portion between the mouth thereof and the lower end of said recess defining an annular shoulder, the inner periphery of said annular shoulder forming an annular cutting edge against which the undersurface of the transverse portion of the annular supporting member is adapted to abut when the mold is closed, said core member comprising a body portion having an enlarged diameter portion at its upper end defining a second annular shoulder, the outer periphery of said second annular shoulder defining an annular clamp member, having a portion which when said core member is moved into the recess, will be vertically aligned with said annular cutting edge, and adapted to abut against the top surface of the transverse portion of the annular supporting member when the mold is closed, the portion of the annular cavity between the core member and the wall of the recess adjacent the annular cutting edge being of enlarged width for formation of the thickened rim of the bladder, whereby, when the said mold is closed, any bladder material extending over said annular cutting edge will be severed from the body of the bladder.

3,904,338

SYSTEM AND METHOD FOR CONTROLLING A MACHINE CONTINUOUSLY FEEDING A SHEET TO INTERMITTENTLY ACTIVATED STATION

Maris Straumanis, Columbus, Ohio, assignor to Industrial Nucleonics Corporation, Columbus, Ohio

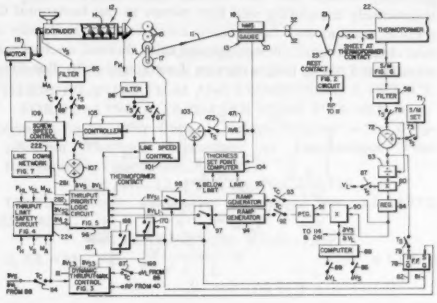
Continuation-in-part of Ser. No. 222,103, Jan. 31, 1972. This application Dec. 28, 1973, Ser. No. 429,676

Int. Cl. B29d *7/22*

U.S. Cl. 425—145 **25 Claims**

3. A system for controlling a machine continuously deriving a sheet that is fed to an intermittently activated, in-line processing station comprising means for measuring the speed of the sheet derived from the machine relative to the speed of the sheet in the processing station, said means for measuring including a variable sheet accumulator between the machine and the station, the two speeds and the accumulator being

such that the accumulator is normally adapted to have a rest state immediately prior to the sheet being supplied to the station, means for measuring the duration of the rest state, means for deriving a first indication of whether the rest period



is constant or changing and for indicating the direction of change and for deriving a second indication of the magnitude of the relative speed, and means responsive to the first and second indications for deriving a control signal for the sheet feed rate.

3,904,339

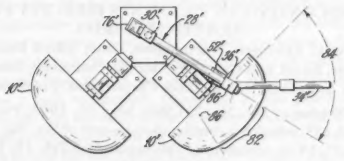
APPARATUS FOR DEPOSITING MATERIALS ON SURFACES OF REVOLUTION

John William Dunn, Sylvania, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 223,160, Feb. 3, 1972, abandoned. This application Oct. 1, 1973, Ser. No. 402,429

Int. Cl. B28b *17/00*

U.S. Cl. 425—162 **17 Claims**



1. Apparatus comprising:

a form having a surface of revolution generated by revolving a curved line about an axis of revolution, and which curved line is made up of at least one circular arc the center of which falls in a first imaginary plane passing through said curved line and said axis of revolution, means rotatably supporting said form about its axis of revolution with the axis of revolution positioned horizontally and with said first imaginary plane being horizontal, a first arm positioned above said surface of revolution in a second plane generally parallel to said first plane, support means for rotatably supporting said arm in said second plane for swinging movement about a vertical support axis which is normal to said second plane and which passes through said center of said circular arc, means for rotating said surface of revolution about said axis of revolution, material deposition means supported from said first arm and constructed and arranged to deposit material on the portion of said surface of revolution through which said first imaginary plane passes, drive means for oscillating said first arm to move said deposition means over at least a portion of said curved line, and control means for varying the speed of said drive means to provide a rate of movement which is generally inversely proportional to the distance of said material deposition means from said axis of revolution.

3,904,340

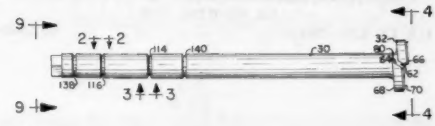
DIE-HEAD

Allen R. Bremer, Seattle, Wash., assignor to Taiga Industries, Inc., San Diego, Calif.

Filed Jan. 28, 1974, Ser. No. 436,842

Int. Cl.² B28B *7/14, 13/00*

U.S. Cl. 425—297 **29 Claims**



1. A rotary die-head for a briquette machine, said rotary die-head comprising:

a. front and back spiral faces;

b. means for cutting a spiral layer from a previously formed mass;

c. said die-head having a transverse groove between said front and back spiral faces for passing said layer from the back sprial face to the front spiral face upon rotation of the die head;

d. means for compressing said spiral layer into a solid cylindrical briquette;

e. said transverse groove running from, approximately, the center of said faces to the periphery of said faces; and,

f. said groove being wider at the interior of said faces than at the periphery of said faces to make a briquette of a, substantially, uniform cross-sectional density.

3,904,341

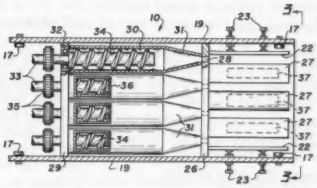
MACHINE FOR EXTRUDING CEMENT-LIKE MATERIAL INTO ARTICLES

George Putti, North Vancouver, Canada, assignor to Dyform Concrete (Prestressed) Ltd., Vancouver, Canada

Filed Mar. 21, 1973, Ser. No. 343,525

Int. Cl.² B28B *21/52*

U.S. Cl. 425—382 **11 Claims**

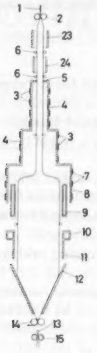


1. In an extrusion machine for making elongated articles of concrete-like material by forcing the material through a mold, said machine being moved forwardly by reaction as the material is forced against the molded portion of the article, the improvement which comprises a fixed transverse plate positioned across and closing the upstream end of the mold and having at least one elongated forming element mounted at an end thereof on the plate and supported thereby so as to extend downstream from the plate within the mold, the transverse plate being apertured adjacent to but out of line with said end of said forming element for the introduction of said concrete-like material into the mold, at least one duct disposed upstream of said transverse plate and communicating with said mold only through an aperture of said transverse plate, each duct having an inlet and including pumping means for feeding said concrete-like material from said inlet and through the associated aperture of said transverse plate into said mold and around said forming element.

3,904,342
APPARATUS FOR MANUFACTURING OF TUBULAR BIAXIALLY STRETCHED FILM HAVING IMPROVED THICKNESS UNIFORMITY

Wasuke Sato, and Osamu Uemura, both of Tokyo, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 129,390, March 30, 1971, abandoned. This application May 3, 1973, Ser. No. 356,782
Claims priority, application Japan, Apr. 3, 1970, 45-27864
Int. Cl. B29d *7/24*
U.S. Cl. 425—384 **10 Claims**



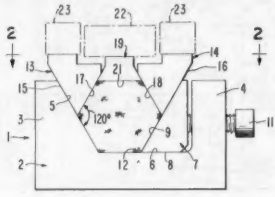
1. An improved apparatus for the manufacture of a tubular biaxially stretched film of synthetic resin, composed of an upper pair of nip rollers adapted to introduce a tube of film of synthetic resin, a lower pair of nip rollers rotated at a greater speed than said upper nip rollers, a heater unit disposed to intervene between said two pairs of nip rollers, a V-shaped stabilizer plate and a gas-introducing unit, the improvement comprising in combination (a) a preheater barrel consisting of (a′) a head portion adapted to permit passage of the tube of film and impede passage of gas and (a″) the inner wall of which has a diameter greater than the diameter of the tube of film, gains stepwise in diameter downwardly and outer wall incorporates an indirect heater element and (b) a stretching barrel adjoining the lowermost end of said preheater barrel and formed of an inner wall which has a diameter greater than that of the stretched tube of film and an outer wall which incorporates an indirect heater element and (c) a cooling jacket disposed below half the height of and beyond said stretching barrel around the path of the stretched tube of film to effect abrupt cooling of the tube of film by intercepting the radiant heat emanating from the outer wall of the stretching barrel toward the tube of film.

3,904,343
MOLD FOR TACKING AN HEXAGONAL BUNDLE OF GLASS FIBERS

Russell J. Scott, Jr., Palo Alto, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed May 10, 1971, Ser. No. 141,532
Int. Cl.² B28B *7/02*
U.S. Cl. 425—472 **6 Claims**

1. In a mold for tacking a bundle of glass fibers into a composite bundle of hexagonal cross section, a channel means having first and second transversly spaced longitudinally directed sides upstanding from a base portion, said base portion having a flat horizontal base face facing upwardly between said upstanding sides to define a first face of the hexagonal bundle, means within said channel and extending along said first upstanding side thereof for defining a flat second face of said hexagonal bundle in a plane inclined at an angle of **120°** to said first horizontal base face, said second face facing generally towards said second side of said channel, first means disposed within said channel and extending along said second side thereof and having a third flat face in a plane inclined at an angle of 120° to said first horizontal base face for defining a third face of the hexagonal bundle, said third face facing generally toward said first side of said channel, means for transversely translating said first means in the horizontal direction, second and third means extending longitudinally of said channel means, along opposite sides thereof, each of said second and third means having fourth and fifth flat faces

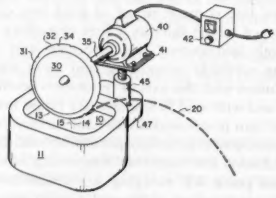


facing into said channel and each inclined at an angle of 120° to said first horizontal base face and being parallel with said aforementioned third and second faces, respectively, to define fourth and fifth faces of the hexagonal bundle, said second and third means being translatable in directions parallel to said aforementioned second and third faces, respectively, and fourth longitudinally directed means interposed between said second and third means and having a horizontal sixth face facing into said channel to define the sixth face of said hexagonal bundle, and said fourth means being vertically translatable.

3,904,344
APPARATUS FOR THE FORMATION OF DISCONTINUOUS FILAMENTS DIRECTLY FROM MOLTEN MATERIAL

Robert E. Maringer, Worthington, Ohio; Alfred Rudnick, Tel Aviv, Israel, and Carroll E. Mobley, Columbus, Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Division of Ser. No. 251,985, May 10, 1972, Pat. No. 3,838,185, which is a continuation-in-part of Ser. No. 147,390, May 27, 1971, abandoned. This application Feb. 19, 1974, Ser. No. 443,349
Int. Cl. B01d *5/26;* **B22d** *11/06*
U.S. Cl. 425—472 **8 Claims**



1. An apparatus for the production of solid filaments from molten material which is at a temperature within **25** percent of its equilibrium melting point in °K, said molten material having a viscosity of 0.001 to 1.0 poise and a surface tension of 10 to 2,500 dynes/cm at said temperature, which apparatus comprises:

a. a pool-like source of said molten material,

b. a heat-extracting disk having at least one circumferentially extending peripheral edge upon which said filaments at least partially solidify, with said edge tapering to a narrow peripheral surface;

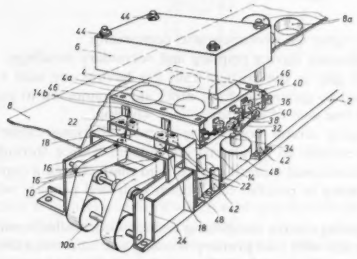
c. at least one indentation on said edge disposed to limit the length of said filaments to the distance between said indentations;
d. means of rotating said disk about its axis of rotation; and
e. means of raising and lowering said disk relative to said pool of molten material.

3,904,345

CUPPING MACHINE FOR PRODUCING CONTAINERS IN THERMOPLASTIC FILM AND COMPRISING A DEVICE FOR PLACING A TAPE-LIKE STRIP IN A MOLD

Raymond Lechevallier, Potigny, France, assignor to Ste. d'Application Plastique Mecanique et Electronique Plastimecanique, Courbevoie, France

Filed Nov. 12, 1973, Ser. No. 414,716
Claims priority, application Germany, Nov. 11, 1972, 2255442
Int. Cl.[2] B29D 9/00; B32B 31/04
U.S. Cl. 425—501 **6 Claims**



1. A cupping machine for producing containers in heated thermoplastic film with tape-like strips sealed to the side walls thereof, said machine comprising a mould including a female half and a male half disposed on opposite sides of said heated thermoplastic film, means for displacing said female mould half along a path substatially transverse to the plane of the thermoplastic film between a first position wherein the female mould half is separated from the male mould half and a second position wherein the two mould halves are brought together to mould a cup-like container in the heated thermoplastic film disposed therebetween, said displacing means maintaining said mould halves in axial alignment throughout the relative movement thereof, and means for inserting a tape-like strip into said female mould half while the latter is in said first position to form a loop directly in said female mould half which is axially aligned with both halves of said mould and which is sealed onto the side walls of the container formed in the thermoplastic film as said female mould half is moved by the displacing means to said second position.

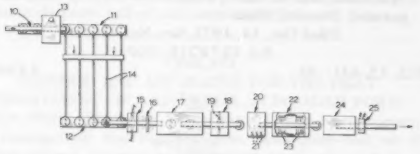
3,904,346

ELECTROSTATIC POWDER COATING PROCESS

Leslie Earl Shaw, R.R. No. 3, Woodbridge, Ontario, and Harold Francis Jarvis, R.R. No. 1, Moffat, Ontario, both of Canada

Continuation-in-part of Ser. No. 211,721, Dec. 23, 1971, abandoned. This application Nov. 12, 1973, Ser. No. 414,924
Int. Cl.[2] B05B 5/02
U.S. Cl. 427—29 **10 Claims**

1. An electrostatic process of coating a cylindrical metal object with powdered resin which includes the steps of shot blasting the object, causing the object to rotate about its axis, and whilst maintaining rotation of the object, sequentially subjecting the object to a high pressure water or steam spray, removing any residual moisture from the object, heating the object to a temperature which will fuse the powdered resin subsequently applied, polarizing the object, electrostatically



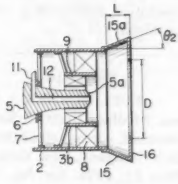
spray coating the object with powdered resin and allowing the coated object to cool.

3,904,347

COMBUSTION APPARATUS WITH ULTRASONIC VIBRATOR

Nerumitsu Rokudo, Nara; Toshiyuki Ishiguro, Tenri, and Makoto Hori, Ikoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 9, 1973, Ser. No. 414,417
Claims priority, application Japan, Nov. 17, 1972, 47-115816
Int. Cl.[2] B05B 3/14; F23C 3/00
U.S. Cl. 431—1 **4 Claims**



1. In a combustion apparatus of the type comprising an outer air duct with a liquid fuel atomizing horn which is vibrated by an ultrasonic vibrator housed within said outer air duct coaxially thereof,

an inner air duct located within said outer air duct coaxially thereof between the front portion of said horn and said outer air duct,

inner air swirling vanes located within said inner air duct, outer air swirling vanes located within said inner and outer air ducts, and

an outwardly diverging cone-shaped cap attached to the front end of said outer air duct, the front portion of said cone-shaped cap being radially inwardly bent to define a center opening,

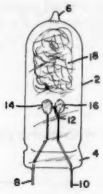
the improvement wherein the radially inner ends of said inner air swirling vanes are spaced apart from each other and are spaced from said horn to define a space between said horn and said inner air swirling vanes, whereby the spaces between said inner air swirling vanes are open to said space between said horn and inner swirling vanes, and the radially outer ends of said swirling vanes are on the inner peripheral wall of said inner air duct,

the ratio θ_2/θ_1 minus 1 being between 3/10 and unity, wherein θ_1 is the angle between said inner and outer air swirling vanes and the axis of said horn and θ_2 is the angle between the tapered portion of said cap and said axis of said horn.

3,904,348
PHOTOFLASH LAMP

Andre C. Bouchard, Peabody, and Thomas J. Sentementes, Wakefield, both of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Dec. 14, 1973, Ser. No. 424,839
Int. Cl.[2] F21K 5/02
U.S. Cl. 431—95 4 Claims

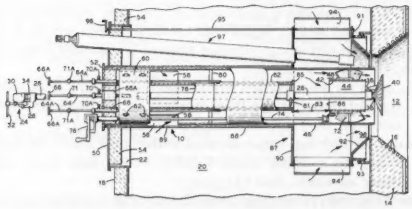


1. A photoflash lamp comprising:
an hermetically sealed, light-transmitting envelope;
a combustion-supporting gas in said envelope;
a quantity of filamentary combustible material located within said envelope, said filamentary material comprising a plurality of strands each having an oxide coating which entirely covers all surfaces thereof, whereby said lamp exhibits a higher light output and color temperature upon ignition of said oxidized filamentary material than a like lamp containing a filamentary combustible material which has not been preoxidized, said light output increase being at least about 3% (0–25 msec.) and 10% (0–∞); and ignition means attached to one end of said envelope and disposed in operative relationship with respect to said combustible material.

3,904,349
FUEL BURNER

Morris W. Peterson, Medina; Brett C. Krippene, Barberton, and David M. Marshall, Akron, all of Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed May 22, 1974, Ser. No. 472,583
Int. Cl.[2] F23M 9/08
U.S. Cl. 431—184 5 Claims

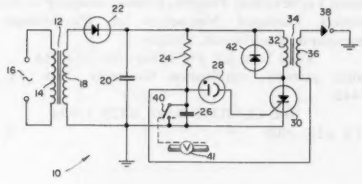


1. In combination with a boundary wall of a furnace, at least one burner port formed in the boundary wall, a burner wall spaced from the boundary wall to form a windbox therebetween to which combustion air is supplied, an open ended member disposed within the windbox and forming a central passageway of circular cross-section coaxially arranged with and having its discharge end opening to said port, conduit means concentrically spaced about said open ended member to form therebetween a first annular passageway discharging into said port, adjustable vane means disposed within said first passageway, a register concentrically spaced about said conduit means to define therewith a second annular passageway discharging into said port, means disposed within said windbox for apportioning the combustion air between said passageways, and nozzle means for introducing a fluent fuel into the port in a pattern substantially symmetrical with the axis of said port.

3,904,350
SPARK IGNITION SYSTEMS

Arthur Richard Goble, Fareham, England, assignor to Pleasey Incorporated, Melville, N.Y.

Filed Aug. 1, 1974, Ser. No. 493,768
Int. Cl.[2] F23Q 3/00
U.S. Cl. 431—256 6 Claims



1. Gas flame ignition apparatus comprising:
a transformer having primary and secondary windings;
a spark gap in the path of said gas having one said connected to ground and the other side connected in series with one side of said secondary winding;
a charging circuit comprising a main charging capacitor connectable to an alternating current source through a unidirectional current device, said main charging capacitor being in parallel connection with said primary winding;
a triggering circuit comprising a silicon-controlled rectifier in series with said primary winding and said main charging capacitor and an RC network including a resistor and an auxiliary capacitor in parallel with said main charging capacitor, the junction of said resistor and auxiliary capacitor being connected to the gate electrode of said silicon controlled rectifier through a voltage-responsive breakdown device;
a flame-sensing circuit comprising a connection between the other side of said secondary winding and the junction of said resistor and auxiliary capacitor; and
normally-closed switch means connected across said auxiliary capacitor and to ground, whereby said main charging capacitor is discharged to ground when said apparatus is off.

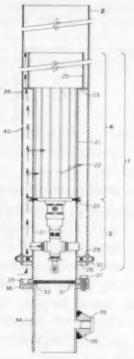
3,904,351
COMBUSTOR AND METHOD OF ELIMINATING ODORS USING THE SAME

James Robert Smith, Plattsmouth, and John Pierce Kendall, Omaha, both of Nebr., assignors to Northern Natural Gas Company, Omaha, Nebr.

Continuation of Ser. No. 406,586, Oct. 15, 1973, abandoned. This application Sept. 13, 1974, Ser. No. 505,727
Int. Cl.[2] F23Q 9/00
U.S. Cl. 431—284 6 Claims

1. A lightweight, relatively inexpensive combustor comprising an elongated cylindrical stack open at the upstream end to allow entry of noxious odorous materials and at the downstream end to allow the burned gases to exit; an effluent combustion tube also open at each end and housed within said stack, said tube defining a primary burner zone and a secondary combustion zone and having openings formed therein at said secondary combustion zone for allowing the passage of air through said tube into said secondary combustion zone at an angle of approximately 90° to the flow of gases within said secondary combustion zone; burner means within said stack defining said primary burner zone and including means for injecting a combustible fuel and air into said primary burner zone to form a fuel-air mixture means for injecting air between

said stack and said tube, said primary burner zone including an expansion zone wherein said fuel-air mixture is formed, a plurality of radially extending inclined swirl blades located in said burner means downstream from said expansion zone which impart a swirling motion to said fuel-air mixture as it flows through openings formed between said blades and, located immediately downstream from said swirl blades and immediately upstream from said secondary combustion zone, a primary combustion chamber in which said swirling fuel-air



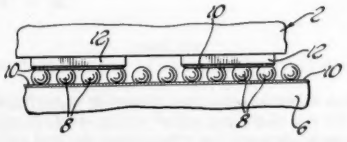
mixture is ignited and from which said ignited fuel-air mixture moves into said secondary combustion zone; and means for allowing said noxious odorous materials entering said upstream end of said stack to pass through said effluent combustion tube, around said primary burner zone, and into said secondary combustion zone wherein said noxious odorous materials ignite upon coming into contact with said ignited fuel-air mixture and are completely burned before exiting out said downstream end of said stack.

3,904,352

ASSEMBLY AND METHOD FOR SUPPORTING CERAMICS AND THE LIKE DURING FIRING

Hans Thurnauer, Boulder, and Lawrence E. Coubrough, Golden, both of Colo., assignors to Coors Porcelain Company, Golden, Colo.

Filed Jan. 17, 1974, Ser. No. 434,319
Int. Cl.² F27D *5/00*
U.S. Cl. 432—5 **20 Claims**



7. A setter assembly for supporting, during firing, an article of sinterable powder material which shrinks during the firing, said setter assembly comprising a refractory support surface, a plurality of laterally spaced refractory plates each having an upper surface for supporting the article to be fired, and at least one refractory rollable element between each of said plates and said support surface.

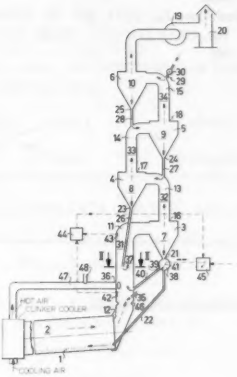
15. A method for firing an article of sinterable powder material which shrinks during firing comprising supporting the article on a plurality of spaced refractory plates which are supported by refractory rollable elements which are in contact with a refractory support surface and which are permitted to roll with respect to the support surface during the firing, and firing the article while so supported whereby during the shrinkage of the article which occurs during the firing said rollable elements roll on said support surface.

3,904,353

METHOD AND APPARATUS FOR THE HEAT TREATMENT OF A MATERIAL IN POWDER FORM

Ulrich Walter Bosshard, Winterthur; Arthur Kurt Kupper, Hunzenschwil, and Manfred Lohr, Schinznach-Bad, all of Switzerland, assignors to Holderbank Management & Consulting Ltd., Holderbank, Switzerland

Filed May 13, 1974, Ser. No. 469,321
Claims priority, application Switzerland, May 14, 1973, 6851/73; Aug. 28, 1973, 12286/73
Int. Cl.² F27B *15/00*
U.S. Cl. 432—14 **28 Claims**



1. A method for the heat treatment of a material in powder form, during the course of which the material undergoes an endothermic reaction and is calcined, which method includes the steps of sintering the raw material in a furnace having a combustion zone by furnace gases produced by supplying fuel and air, preheating the material at least partly in a preheating stage having a mixing zone in which the material is mixed with furnace exhaust gases and a separating zone in which the material is separated from those gases and from which separating zone it is conducted to the furnace inlet, and producing additional furnace gases by means of fuel and air outside the furnace in a second combustion zone and mixing these gases with the furnace exhaust gases between said stage and the furnace inlet, characterized by the steps of producing said additional furnace gases in the furnace exhaust gas flow by introducing fuel and air directly into the said flow, the second combustion zone coinciding approximately with said mixing zone; and branching off from the flow of material a return flow and introducing same into the second combustion zone.

16. Apparatus for the heat treatment of material in power form comprising a furnace having an inlet, and a combustion zone in which said material is sintered by furnace gases; means defining a material preheat stage including a separating device having a gas-material separating zone which is connected by a vertical furnace exhaust gas pipe to the furnace inlet, and a material discharge union which is connected with the furnace inlet via a material conduit; a material supply conduit opening into said furnace exhaust gas pipe, whereby the latter serves as a gas-material mixing zone for said preheat stage; and means defining a second combustion zone situated outside the furnace and providing with devices for introducing fuel and air

thereto; characterized in that the second combustion zone is located in the furnace exhaust gas pipe and coincides approximately with said mixing zone, said devices for supplying fuel and air opening into the exhaust gas pipe; by means for branching off a return flow of material from the material flow at said preheat stage; and by a return conduit for conveying said return flow to the second combustion zone.

3,904,354

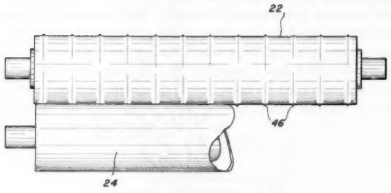
RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL

Rabin Moser, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 23, 1973, Ser. No. 418,515

Int. Cl.[2] F27B *9/28;* **B60B** *5/00*

U.S. Cl. 432—60 **9 Claims**



1. Xerographic reproducing apparatus having means for forming toner images on a substrate including means for moving said substrate through said apparatus for such purposes, said moving means comprising at least one pair of nip forming members through which said substrate moves, and wherein said substrate tends to adhere to one of said members, the improvement comprising:

means formed integrally with said one of said nip forming members for insuring separation of said substrate from said one of said members after movement through said nip, said integrally formed means comprising a plurality of protrusions on the surface of said one of said members, said protrusions constituting means being capable of being compressed as they move through said nip to form substantially a flat surface at the nip and returning to their protruding positions thereafter.

7. The method of affixing toner images to a substrate including the steps of:

providing a pair of nip forming members, at least one of which has substrate stripping means comprising a plurality of protrusions on the surface thereof, said protrusions constituting means being capable of being compressed as they move through said nip to form substantially a flat surface at the nip and returning to their protruding positions thereafter;

moving said members in synchronism to thereby move said substrate through said nip and moving said protrusions to a compressed position as they move through said nip; and allowing said protrusions to move to protruding positions after leaving said nip.

3,904,355

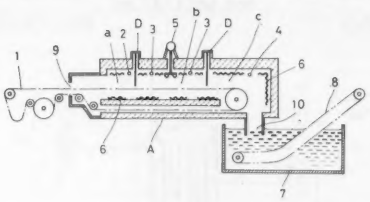
ATMOSPHERE ISOLATING MEANS IN A CONTINUOUS-YPE FURNACE

Susumu Takahashi, 12/21, 5-chome, Wakabaya, Setagaya-ku, Tokyo, Japan

Filed July 17, 1974, Ser. No. 489,080

Int. Cl.[2] F27B *9/04*

U.S. Cl. 432—152 **2 Claims**



1. In combination with a continuous-type furnace in which articles to be treated are transferred by conveyor means through a plurality of treating zones, means for controlling and maintaining gas atmospheres for such zones comprising a plurality of curtains arranged one closely after the other, each said curtain comprising a plurality of sets of metal segments, which are all of the same height, the segments of each set being arranged in alignment laterally but being staggered relative to those of the next adjacent set, said curtains constituting isolating means between the adjacent zones, and being freely suspended above the conveyor means for isolating the atmospheres supplied to ssiad zones from one another and for allowing the articles to freely pass through the zones via said isolating means.

3,904,356

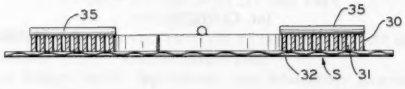
OPEN COIL HEAT SHIELDING

Robert R. Hill, Westlake, and Robert J. Beemer, Bay Village, both of Ohio, assignors to Lee Wilson Engineering Company, Inc., Cleveland, Ohio

Filed Apr. 29, 1974, Ser. No. 465,428

Int. Cl. F27d *23/00;* **F27b** *21/00*

U.S. Cl. 432—249 **20 Claims**



20. A heat shield structure adapted to be supported on the free top end of an open coil of spaced apart convolutions of strip metal disposed with the axis of the coil substantially vertical and to substantially prevent the direct impingement of radiant heat against the top edge portions of said coil at said free top end of said coil without substantially interfering with the flow of treating gas through the spaces between said spaced apart convolutions of said open coil, which heat shield structure comprises a plurality of spaced apart adjacent baffle wall portions each having one edge lying substantially in a common plane from which said wall portions extend transversely, the other edge of each of said wall portions being located from said first mentioned edge by a distance greater than the distances said wall portions are spaced apart, and means for securing said wall portions together in said rigid heat shield structure.

3,904,357
MEANS FOR PROMOTING COLOR CHANGE IN BLEACHED OR UNTREATED HAIR

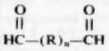
James F. Kinney, Ramsey, N.J., and Antoni Edward Gadzala, Suffern, N.Y., assignors to Avon Products, Inc., New York, N.Y.

Filed Oct. 30, 1972, Ser. No. 301,785The portion of the term of this patent subsequent to Mar. 18, 1992, has been disclaimed.

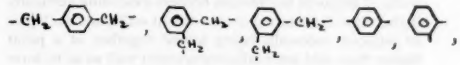
Int. Cl.[2] A61K *7/12, 7/13, 7/135*

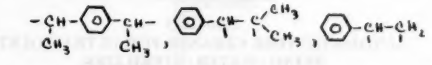
U.S. Cl. 8—10.2 7 Claims

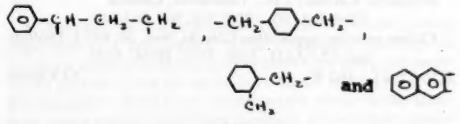
1. An aqueous hair dyeing composition comprising from about 0.05 to about 5 percent of a dialdehyde having the general formula:



wherein *n* may be 0 or 1 and when *n* equals 1 R represents a divalent radical selected from the group consisting of methylene, ethylene, propylene, butylene, pentamethylene,







and from about 0.01 percent to about 5 percent of at least one mono or polyamine dye suitable for absorbstion or aggregation techniques of dyeing human hair.

3,904,358
PROCESS FOR DYEING ACID-MODIFIED NYLON WITH BISCATIONIC AZO DYES

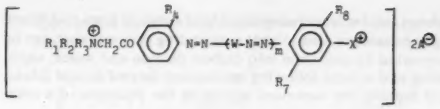
Daniel Shaw James, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 58,707, July 27, 1970, Pat. No. 3,759,893. This application May 16, 1973, Ser. No. 356,908

Int. Cl.[2] D06P *1/06, 3/24*

U.S. Cl. 8—41 B 2 Claims

1. In a process for dyeing nylon styling yarns comprising contacting said yarns with a dye dispersed in an aqueous dyebath having a pH of from 3 to 9 and a temperature of about from 70° to 100°C. and containing about from 0.05 to 0.5% based on the weight of the yarn of a dyeing assistant, the improvement comprising using a biscationic azo dye having the formula:



where

R_1 is alkyl

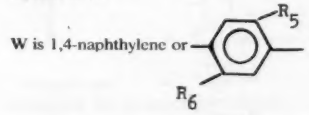
R_2 is alkyl or hydroxyalkyl

R_3 is alkyl, hydroxyalkyl or banzyl

or R_2 and R_3 together is piperidinium or pyrrolidinium

or R_1, R_2, and R_3 together is pyridinium

R_4 is H or Cl

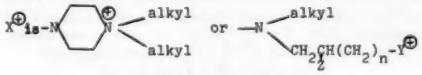


W is 1,4-naphthylene or

R_5 and R_6 is H, alkyl, alkoxy or Cl

R_7 is H, alkyl, alkoxy, Cl NHCO alkyl or $NHCOC_6H_5$

R_8 is H, Cl, alkyl or alkoxy



Y⊕ is $\overset{\oplus}{N}R_9R_2R_3$ or $NHCOCH_2{}^{+}\overset{\oplus}{N}R_9R_2R_3$, where R_9 is R_1 or H

m is 0 or 1

n is 0 or 1

Z is H when $n = 0$ and OH when $n = 1$

A^- is anion

and where each alkyl, alkoxy and hydroxyalkyl contains 1 to 4 carbon atoms; at a pH of from 6 to 6.5.

3,904,359
POST-WASH FABRIC TREATING METHOD

Pallassana Ramachandran, Robinsville, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Sept. 7, 1972, Ser. No. 286,995

Int. Cl.[2] B08B *3/00*

U.S. Cl. 8—137 9 Claims

1. A process for treating fabrics which are subject to yellowing in rinse water comprising laundering said fabrics and treating said fabrics at a temperature of about 70°F to about 120°F with an aqueous solution containing from about 0.01 to about 0.1% by weight of a complexing acid and from 0 to 0.1% by weight of a cationic fabric softener, whereby yellowing imparted to said fabrics in part by said cationic fabric softener is substantially reduced by said complexing acid.

3,904,360
METHODS OF DYEING FABRIC WITH A HYDROCARBON SUBSEQUENTLY BURNED

Manfred Schuierer, Erbach, Odenwald, Germany, assignor to Bruckner Apparatebau GmbH, Erbach, Odenwald, Germany

Filed Feb. 21, 1973, Ser. No. 334,310

Claims priority, application Germany, Feb. 21, 1972, 2208052

Int. Cl.[2] D06P *5/04*

U.S. Cl. 8—173 10 Claims

2. A method of applying to a textile fabric a finished chemical such as dyestuffs, said method comprising applying to said fabric a liquid mixture containing said chemical and organic

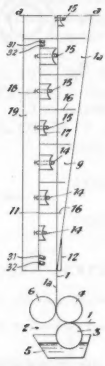
solvent, said solvent being capable of removal from said fabric by vaporisation, said solvent constituting only one that can be converted by oxidation into carbon dioxide and water; vaporising said solvent following application thereof to said fabric; and burning the vaporised solvent in the presence of a catalyst.

3,904,361

PROCEDURE AND A DEVICE FOR THE STERILIZATION OF PACKAGING MATERIAL

Hermann Egger, CH-1717 St., Ursen (FR), Switzerland

Filed May 11, 1972, Ser. No. 252,259
Claims priority, application Italy, May 19, 1971, 50425/71
Int. Cl. A61l *1/00, 3/00;* **B65b** *9/12*
U.S. Cl. 21—57 **13 Claims**



1. A process for the sterilization of the surface of a web of packaging material which is to become the internal surface of the container formed from the web, comprising the steps of: applying to the web surface a film of a sterilizing liquid:

bringing said web surface, after the application of said film, past and in contact with an atmosphere formed within an essentially closed sterilization chamber to prevent the evaporation of said film in said chamber;

spraying said chamber with steam and vapors of said sterilizing liquid unitl said atmosphere is saturated therewith;

heating said liquid film immediately upon its contact with said atmosphere to a temperature just below its boiling point;

keeping said liquid film at this temperature throughout its passage past said atmosphere;

drying said hot liquid film with a flow of hot dry sterilized air thereover at its issue from said saturated atmosphere.

3,904,362

TOOTHBRUSH STERILIZATION HOLDER AND CONTAINER

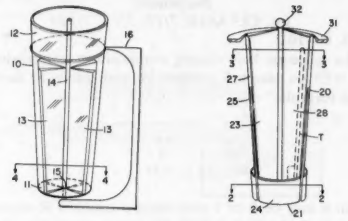
Edmund C. DiPaolo, 111 Rancocas Blvd., Rancocas Woods, N.J. 08073

Filed Feb. 8, 1974, Ser. No. 440,712
Int. Cl. A61l *3/00;* **A46b** *17/06*
U.S. Cl. 21—87 **4 Claims**

1. An article for storing toothbrushes immersed in separated antiseptic liquid environments comprising

a. a cup-shaped body formed by a solid bottom wall, a solid cylindrical vertical body wall having a circular cross-section, said solid cylindrical vertical body wall attached to said bottom wall, and vertical internal compartment walls attached to the bottom wall and the cylindrical vertical body wall so as to form a plurality of liquid-tight compartments, said cup-shaped body being open at the top thereof,

b. a toothbrush holding member having a plurality of toothbrush holders, said toothbrush holders formed of sidewalls and a bottom wall having apertures therein, wherein the toothbrush holders slideably fit the inside dimensions of the liquid-tight compartments, the sidewalls of each toothbrush holder being adapted to abut against the inter-



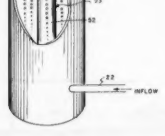
nal compartment walls of the cup-shaped body, the sidewalls of adjacent toothbrush holders extending vertically higher than the internal compartment walls, and each pair of adjacent sidewalls being joined together at a point higher than said internal compartment wall so as to form a unitary solid wall above its respective compartment wall.

3,904,363

AUTOMATIC TUBE CLEANER FOR ULTRAVIOLET FLUID (WATER) STERILIZER

David Free, West Vancouver, Canada, assignor to Naturvard Research (Canada) Ltd., Vancouver, Canada

Filed Oct. 10, 1973, Ser. No. 404,927
Claims priority, application Canada, Nov. 20, 1972, 156920
Int. Cl.[2] A61L *3/00, 3/02;* **H05C** *3/00*
U.S. Cl. 21—102 R **13 Claims**



1. A liquid sterilization system comprising: a cylinder having liquid inlet and outlet means and having an inner wall which defines a chamber and positioned in said chamber a coaxially-longitudinally located source of ultraviolet radiation comprising a protective ultraviolet-transmissive, cylindrical sheath containing an ultraviolet-radiation generating means, and, a cleaning device adapted to pass to and fro within the chamber, during flow and non-flow of the liquid to be sterilized, characterized in that the cleaning device comprises:

a. a first ring-like member having an orifice, therein through which a liquid may flow;

b. a flexible inner member attached to and disposed radially inward of the first ring-like member with the inner periphery of said inner member biasly urged against the said ultraviolet-transmissive, cylindrical sheath;

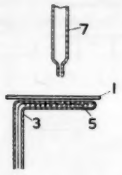
c. a flexible resilient outer member attached to and disposed radially outward of the first ring-like member and having the outer circumference of said outer member biasly urged against the inner wall of the sterilization cylinder whereby, during a liquid flow condition, the cleaning

device is forced to rise within said chamber, and, during a non-flow condition of the liquid, the weight of the cleaning device causes the device to fall and whence, during each condition, the inner member scrapes the ultraviolet-transmissive, cylindrical sheath, and thereby cleans said sheath, and wherein during such flow conditions the orifice in said first ring-like member permits liquid to pass from one side of the cleaning device to the other and hence through the said chamber.

3,904,364
METHODS OF AND APPARATUS FOR DETERMINING TRACE IMPURITIES

Edith Margaret Dodson, Malvern, England, assignor to National Research Development Corporation, London, England

Filed July 12, 1972, Ser. No. 271,210
Claims priority, application United Kingdom, Feb. 18, 1972, 7512/72
Int. Cl. G01n *31/20, 33/18, 25/20*
U.S. Cl. 23—230 R **13 Claims**



1. A method of determining the quantity of organic carbon impurities in a non-organic liquid comprising the steps of heating a layer of sintered, porous absorbent inorganic material to provide a ring on the layer of higher temperature than the remainder of the layer, adding to the center of the layer, from which location it diffuses outwards, a controlled amount of reagent having the property that it will convert the organic impurities to free carbon on the layer adding a controlled small quantity of the non-organic liquid to be tested onto the center of the layer, converting the organic impurity to free carbon on the layer, and thereafter determining the carbon concentration in the layer.

3,904,365
METHOD AND APPARATUS FOR MEASURING THE PRESENCE OF A WEAK ACID OR A WEAK BASE IN A LIQUID

Thurston E. Larson; Russell W. Lane, and Chester H. Neff, all of Champaign, Ill., assignors to Department of Registration and Education of the State of Illinois, Champaign, Ill.

Filed Aug. 18, 1972, Ser. No. 281,778
Int. Cl. G01n *27/56, 31/16, 33/18*
U.S. Cl. 23—230 R **30 Claims**

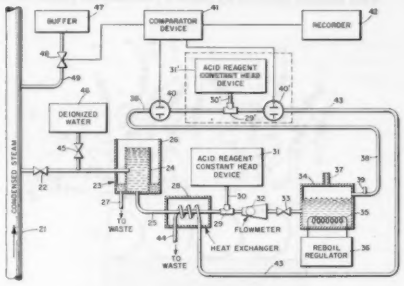
1. A method of measuring the presence of a weakly acidic or basic chemical in a liquid, wherein a substantial portion of said weakly acidic or basic chemical is present in un-ionized form, said method comprising the steps of:

withdrawing a representative sample of the liquid in which an amount of said chemical is present;

reacting all of said chemical in said sample by mixing said sample with a known amount of a reagent selected from the group consisting of relatively strong acids when said chemical is a weak base and relatively strong bases when said chemical is a weak acid;

said known amount of reagent being in excess of the amount required to completely react with all of said chemical in the sample;

measuring the electrical conductivity of the sample after mixing with the reagent, said conductivity including an appreciable conductivity contribution due to the excess reagent after all of said chemical has been reacted with



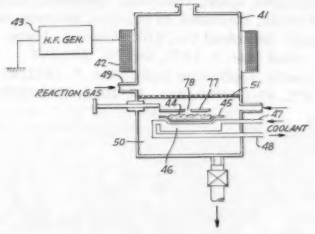
reagent; and

comparing the measured conductivity to a standard value.

3,904,366
METHOD FOR THE QUANTITATIVE ELEMENTARY ANALYSIS OF PREFERABLY ORGANIC SUBSTANCES

Fritz Grasenick, Hugo Schuchardstrasse 19, Graz, Austria

Continuation of Ser. No. 765,543, Oct. 7, 1968, abandoned. This application Nov. 17, 1972, Ser. No. 307,519
Int. Cl. B01k *1/00;* **G01n** *31/12*
U.S. Cl. 23—230 PC **2 Claims**



1. A method for quantitatively determining the chemical composition of a sample substance comprising the steps of:

selecting a gas from the group consisting of hydrogen and oxygen;

directing said gas to sample areas defined by means of mechanical diaphragms;

activating said gas by means of an electrical discharge at a sub-atmospheric pressure;

converting the portions of the sample at said areas into gaseous compounds by combining the same with the activated gas; and

thereafter quantitatively determining said chemical composition by analyzing said gaseous compounds.

3,904,367
CONTRAST ENHANCEMENT FOR IMMUNOLOGICAL FILM DETECTION

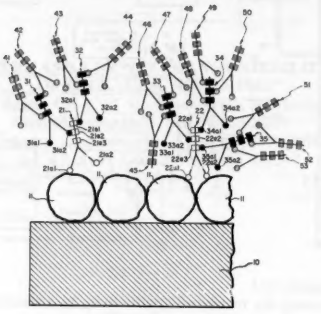
David C. Golibersuch, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 15, 1973, Ser. No. 388,407
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B **3 Claims**

1. A method for improving the detection sensitivity of immunologic diagnostic slides, said slides comprising a substrate having a layer of particles of a first protein adsorbed thereon for specifically reacting immunologically with a second pro-

tein, said second protein being the protein to be detected, said method comprising the steps of:

a. contacting said slide with a fluid suspected of containing said second protein to bond a plurality of particles of said



second protein to particles of said first protein; and then

b. contacting said slide with a solution of a third protein immunologically reactive with said protein to be detected, said first, second and third proteins all being different from each other.

3,904,368

BURNING AND COLLECTION APPARATUS FOR COMBUSTION GASES

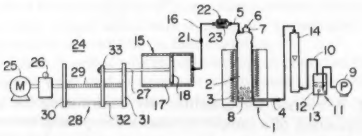
Kenichi Takeyama, Kobe; Takayoshi Morimoto, Ashiya, and Fumiya Konishi, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Mar. 5, 1973, Ser. No. 338,194

Claims priority, application Japan, Mar. 7, 1972, 47-23662; Nov. 30, 1972, 47-120900; Nov. 30, 1972, 47-120901

Int. Cl.[2] G01N *31/12*

U.S. Cl. 23—230 PC **4 Claims**



1. A burning and collection apparatus for combustion gases, comprising combustion means having a combustion chamber for placing sample material therein and an electric heating furnace capable of adjustably heating said combustion chamber, gas supply means for supplying air or other gas into the combustion chamber at an adjustable rate, piston-cylinder type gas collection means having a cylinder communicating with the combustion chamber by a gas exhaust passage having a cooling effect sufficient to condense aqueous vapor and a piston disposed slidably in said cylinder, the gas being collected in a collection chamber defined by said piston and the interior of said cylinder, driving means for creating relative movement between the piston and cylinder at an adjustable predetermined speed and in a direction causing suction of the combustion gases into the collection chamber so that said suction is at a rate corresponding to the supply rate of air or other gas into the combustion chamber, the dimensions of said cylinder and piston being such that sealing is created between said cylinder and piston wherein gas is allowed to flow into said collection chamber between said cylinder and said piston to eliminate the pressure differential between the interior and exterior of said cylinder caused by the sucking of said combustion gases by said piston, and when combustion gases are not being sucked, gas flow between said piston and said cylinder is prevented.

3,904,369

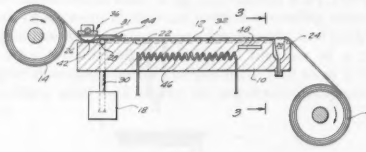
METHOD AND APPARATUS FOR CONTROLLING THE TEMPERATURE OF A TAPE

Stanford L. Adler, Monsey, and William J. Calogero, Hopewell Junction, both of N.Y., assignors to Technicon Instruments Corporation, Tarrytown, N.Y.

Filed June 1, 1973, Ser. No. 366,236

Int. Cl.[2] G01N *33/16;* **B05C** *11/105*

U.S. Cl. 23—230 R **10 Claims**



1. A method of controlling the temperature of a tape element in a tape run for a temperature-responsive chemical reaction of substances supported on said tape, utilizing a tape support element having a tape support surface elongated in the direction of the tape run, said tape support surface having a tape-receiving part spaced from a tape-delivery part thereof, comprising:

intimately supporting said tape element by said support element, with the surface of said tape element opposing said support surface;

relieving said support surface longitudinally thereof to limit adherence of said tape element to said support element; controlling the temperature of said support surface for said temperature-responsive reaction;

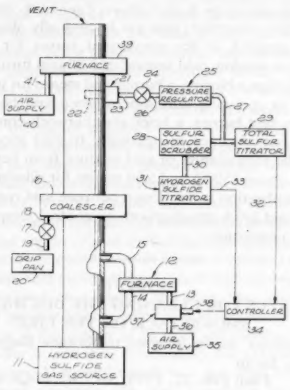
introducing a relatively small quantity of a temperature-exchange liquid between said elements in proximity to said tape-receiving part to spread by capilarity in a thin film in the direction toward said tape-delivery part; and moving said tape element in a direction toward said tape-delivery part, thereby enhancing the spreading of said thin liquid film in said direction.

10. In apparatus for controlling the temperature of a tape element in a tape run, comprising: a support element having a tape-supporting surface elongated in the direction of the tape run for cooperation with a surface of the tape element, said surface having a tape-receiving part spaced from a tape-delivery part thereof, means for directing the tape run closely over said surface, means controlling the temperature of said support surface, means for introducing a relatively small quantity of a temperature-exchange liquid between said elements in proximity to said tape-receiving part to spread by capillarity in a thin film in a direction toward said tape-delivery part, and means moving said tape element in a direction toward said tape delivery part, thereby enhancing the spreading of said film in said direction: the improvement wherein said support surface is provided with a plurality of tape-supporting lands intermediate said tape-receiving part and said tape-delivery part, said lands being arranged lengthwise of said support element in spaced relation to each other transversely of said support element.

3,904,370
METHOD FOR CONTROLLING A CLAUS PROCESS

James Ray Robison, La Mirada, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 406,379, Oct. 15, 1973, Pat. No. 3,854,884. This application Aug. 12, 1974, Ser. No. 496,705
Int. Cl.² C01B 17/04; G01N 31/16
U.S. Cl. 23—230 A 3 Claims



1. The method of controlling a process comprising the steps of: producing a flow of hydrogen sulfide (H_2S) in a flow confining apparatus; injecting oxygen into at least a portion of said H_2S flow under conditions to oxidize a portion of said H_2S flow; removing a sample of the sulfur dioxide (SO_2) and products of said oxidation and the remainder of said hydrogen sulfide and other flow, if any; scrubbing a portion of said sample to remove the hydrogen sulfide therein and to pass the sulfur dioxide therein; titrating the scrubbed and unscrubbed sample portions to determine the ratio of the concentration of the hydrogen sulfide therein to the concentration of the sulfur dioxide therein; and varying the oxygen flow rate in a sense to cause said ratio to be approximately 2:1.

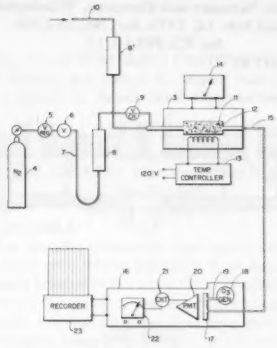
3,904,371
CHEMILUMINESCENT AMMONIA DETECTION

Radhakrishna M. Neti, Brea, and George S. Turner, Fullerton, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Mar. 4, 1974, Ser. No. 448,021
Int. Cl.² C01B 21/26; G01N 21/52, 31/10
U.S. Cl. 23—232 R 6 Claims

1. The method of converting ammonia in a gaseous mixture to nitric oxide which comprises the steps of:

passing the mixture over a body of particulate matter comprising vitreous carbon and an oxide of a metal selected from the group consisting of a platinum group metal,



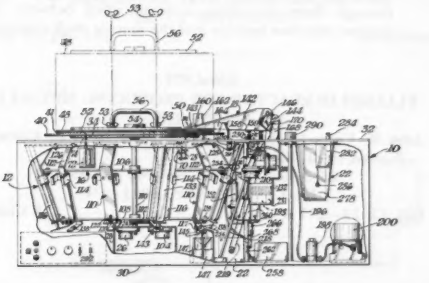
copper, nickel, cobalt and iron, and

maintaining the temperature in excess of 400°C.

3,904,372
AUTOMATIC THIN LAYER CHROMATOGRAPHIC APPARATUS

Gene E. Lightner, R.D. No. 1, Kennett Square, Pa. 19348

Filed Jan. 11, 1973, Ser. No. 322,869
Int. Cl.² G01A 31/08; B01D 15/08
U.S. Cl. 23—253 R 28 Claims



1. Apparatus for automatically processing liquid samples with discrete, thin layer chromatographic elements each being independent of and freely movable relative to each other comprising, in combination:

spotting means for depositing an aliquot of selected ones of said samples at a predetermined spot on different ones of said chromatographic elements, and

developing means for sequentially subjecting each of said elements to a solvent.

3,904,373
INDICATORS COVALENTLY BOUND TO INSOLUBLE CARRIERS

Gerald Bruce Harper, c/o Lash Miller Chem. Labs, 80 St. George St., Toronto, Canada (M55-1A1)

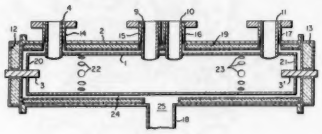
Filed Oct. 26, 1973, Ser. No. 409,876
Int. Cl. G01n 29/02, 31/00, 33/00
U.S. Cl. 23—253 TP 17 Claims

1. An insolubilized bound indicator useful in determining parameters such as hydrogen ion concentration (p^H), oxidation-reduction potential or specific ion concentrations in solutions consisting of an organic indicator covalently coupled by means of an organo-functional silane coupling agent to an inorganic carrier having available hydroxyl or oxide groups.

3,904,374
EXHAUST GAS REACTOR SUPPORTING PINS

Iver Theodore Rosenlund, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 14, 1973, Ser. No. 332,504
Int. Cl. F01n 3/10
U.S. Cl. 23—277 C 1 Claim



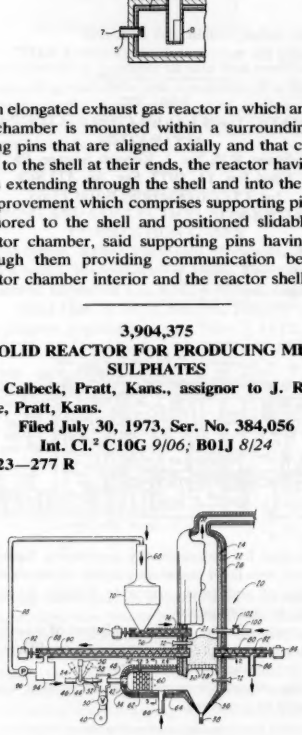
1. In an elongated exhaust gas reactor in which an elongated reactor chamber is mounted within a surrounding shell by supporting pins that are aligned axially and that connect the chamber to the shell at their ends, the reactor having exhaust gas inlets extending through the shell and into the chamber,

the improvement which comprises supporting pins that are anchored to the shell and positioned slidably into the reactor chamber, said supporting pins having passages through them providing communication between the reactor chamber interior and the reactor shell exterior.

3,904,375
FLUOSOLID REACTOR FOR PRODUCING METALLIC SULPHATES

John H. Calbeck, Pratt, Kans., assignor to J. R. Calbeck, Trustee, Pratt, Kans.

Filed July 30, 1973, Ser. No. 384,056
Int. Cl.[2] C10G 9/06; B01J 8/24
U.S. Cl. 23—277 R 8 Claims

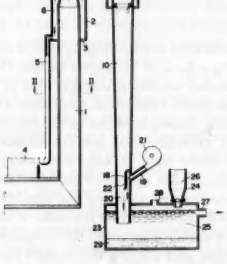


1. A fluosolid reactor for producing metallic sulphates comprising a reaction chamber having an exit, means attached to said chamber for introducing into said reaction chamber a mixture of metallic sulphides, the corresponding metallic sulphates, and ammonium sulphate, means connected to said chamber for discharging from said reaction chamber said produced metallic sulphates including said metallic sulphides in suspension, means attached to said chamber for producing products of combustion of a heating fuel for directly contacting and heating said mixture to produce said metallic sulphates, means secured to said chamber for lodging said mixture while being directly contacted and heated with said products of combustion, said means for lodging comprising a plate connected to the inside walls of said reaction chamber and said plate includes a structure defining a plurality of apertures extending entirely therethrough, and a means attached to said chamber for circulating a fraction of said produced metallic sulphates including said metallic sulphides in suspension to said means for introducing, said means for discharging being situated lower than said means for introducing said mixture, and said means for circulating said produced metallic sulphates being positioned lower than said means for introducing said mixture and generally diametrically opposed to said means for discharging, said means for producing products of combustion is a furnace horizontally disposed with respect to said reaction chamber and having a first end and a second end, said first end of said furnace comprises said reaction chamber attached at the top thereof in communication therewith and a pit positioned in the bottom thereof generally directly under said reaction chamber, said pit is conically shaped and includes a petcock in the convergent vertex for discharging combustion residue, said second end of said furnace includes in combination a blower, a burner and means for producing an oxidizing or reducing atmosphere when said heating fuel is burned by said burner, a brick checkerwork connects to the inside of said furnace in proximity to said second end for holding the temperature of said mixture from between about 300° and about 450°C, and said means for diluting said products of combustion is positioned between said reaction chamber and said brick checkerwork to control temperature and chemical properties.

3,904,376
APPARATUS FOR CLEANING THE DISCHARGE OF A SMOKESTACK OR THE LIKE

Tadao Kawata, Japan, assignor to Kawada Kogyo Kabushiki Kaisha, Japan

Filed Feb. 22, 1974, Ser. No. 444,878
Claims priority, application Japan, Feb. 23, 1973, 48-22725
Int. Cl.[2] B01J 1/22; B01D 53/34
U.S. Cl. 23—284 15 Claims



1. In an apparatus to be used with a smokestack having a discharge end region from which a discharge flows outwardly beyond the smokestack, mixing chamber means fluid-tightly communicating with the discharge end region of the smokestack for receiving the discharge therefrom, steam-supply means communicating with said mixing chamber means for supplying thereto steam to be mixed with the discharge from the smokestack, conduit means having an inlet end communicating with said mixing chamber means to receive the mixture of steam and smokestack discharge therefrom and an outlet end distant from said mixing chamber means, said conduit means directing the mixture from said mixing chamber means to said outlet end of said conduit means, liquefying means operatively connected with said conduit means between said

ends thereof for cooling the mixture flowing through said conduit means and for liquefying at least a substantial portion of the mixture before the mixture reaches said outlet end of said conduit means, and treating means communicating fluid-tightly with the outlet end of said conduit means for treating the products received from said outlet end of said conduit means in a manner providing for release of only non-noxious components from said treating means, said mixing chamber means being of a tubular configuration and forming an extension of said inlet end of said conduit means extending from the latter toward said discharge end region of said smokestack, said steam-supply means including a cylindrical enclosure fluid-tightly surrounding and spaced in part from said discharge end region of said smokestack for defining with the exterior of the smokestack at said discharge end region thereof a steam chamber from which steam flows with the discharge of the smokestack into said mixing chamber means, a Venturi means being situated between said steam chamber and mixing chamber means and having a throat region situated adjacent but beyond said smokestack for receiving at its throat region both the discharge from the smokestack and the steam from the steam chamber and for directing the steam from the steam chamber and the discharge from the smokestack at less than atmospheric pressure into the mixing chamber means, said discharge end region of said smokestack, said steam chamber, Venturi means, and mixing chamber means all having a common upright axis with said steam chamber and discharge end region of said smokestack being situated at the same elevation while said Venturi means is situated at a higher elevation than said steam chamber and said mixing chamber means is situated at a higher elevation than said Venturi means, said conduit means being of a substantially U-shaped configuration at the region of its inlet and curving from said inlet first upwardly and then downwardly and extending downwardly from said U-shaped region in a direction substantially parallel to said common axis, said liquefying means being operatively connected with said conduit means at a part thereof which is situated beyond but adjacent said U-shaped region.

3,904,377

LIGHTWEIGHT COMPOSITE CONTAINING HOLLOW GLASS MICROSPHERES

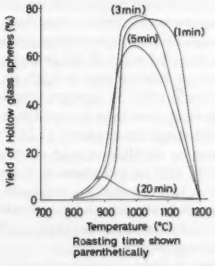
Hidemasa Honda; Yukio Isayama; Kazuhiko Jinnai, and Kunio Kimura, all of Tosu, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

Continuation-in-part of Ser. No. 120,253, March 2, 1971, Pat. No. 3,752,685. This application July 23, 1973, Ser. No. 381,778

Claims priority, application Japan, Mar. 6, 1970, 45-18722

Int. Cl.[2] B22D *19/00*

U.S. Cl. 29—180 R **3 Claims**



1. A composite material essentially consisting of a metal and of hollow glass microspheres dispersed in said metal, said metal being free from voids, the melting point of said metal being lower than the melting point of the glass in said microspheres, said microspheres being produced by sintering pumice particles smaller than 250 microns at 800° to 1200°C.

3,904,378

STEEL CLAD STAINLESS COMPOSITE ARTICLE

David A. Higbee, and Joseph C. Jasper, both of Middletown, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Continuation-in-part of Ser. No. 162,660, July 14, 1971, abandoned, which is a division of Ser. No. 796,616, Feb. 4, 1969, Pat. No. 3,621,561. This application Nov. 8, 1973, Ser. No. 413,849

Int. Cl. B32b *15/00*

U.S. Cl. 29—183.5 **14 Claims**

1. A flat metallic composite cast ingot comprising a thin stainless steel core whose thickness is at least 0.5% of said article fusion bonded between two thicker outer layers of steel selected from the group consisting of low alloy steel and low carbon steel, the said stainless steel core exhibiting substantially its original integrity, by virtue of minimum diffusion of carbon into the stainless steel, and minimum diffusion of chromium out of the stainless steel.

3,904,379

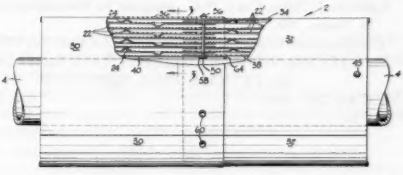
TELESCOPING REFLECTIVE THERMAL INSULATING STRUCTURE

Nathan Oser, Monmouth; Edmund John Niedzinski, Somerset; John Kubicek, and Richard Lee Lewis, both of Hunterdon, all of N.J., assignors to Johns-Manville Corporation, Denver, Colo.

Filed May 13, 1974, Ser. No. 469,166

Int. Cl.[2] B21D *39/00*

U.S. Cl. 29—191 **10 Claims**



1. An extensible reflective metallic thermal insulation structure comprising:

a. a first section; and

b. a second section;

c. each of said sections comprising an inner plate and an outer plate and disposed therebetween a plurality of reflective sheets, said sheets being separated one from another by spacer means;

d. each of said sheets in one of said sections slidably abutting a corresponding plate in the other of said sections;

e. the outer plate of said first section slidably abutting and inwardly disposed of said outer plate of said second section;

f. each sequential pair of sheets of one section being disposed between sequential pairs of sheets of said other section, and

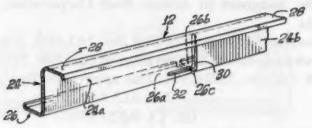
g. restraining means cooperating with said outer plate of said second section to restrict the outward movement thereof;

whereby said sections can telescopically move relative to each other while simultaneously maintaining proper spacing of the sheets in each section.

3,904,380
STRUCTURAL BEAM

Marjorie Ann M. Smith, 3825 Valley Blvd., No. 59, Walnut, Calif. 91789

Filed July 24, 1973, Ser. No. 382,185
Int. Cl.[2] B21C *37/00*
U.S. Cl. 29—193 **11 Claims**



1. A structural beam comprising:

a channel member having a web and flanges along the longitudinal edges of and normal to said web,

said member having a first slot extending through one flange and said web in a plane normal to said web and transverse to the longitudinal axis of the member and splitting said web and one flange into two separate sections having adjacent web and flange section ends, respectively,

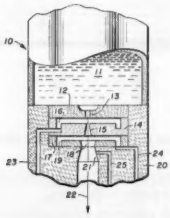
said member having a second slot extending through one web section from said first slot substantially along the intersection of said web and said one flange and defining a bendable portion of said one flange between the ends of said second slot, and

said channel member being adapted to be formed to an angle by first bending said bendable flange portion away from the other flange about a bend line normal to said web and then bending said other flange about a bend line in said plane to bring said flange and web ends into overlapping relation.

3,904,381
CAST METAL WIRE OF REDUCED POROSITY

Emerick J. Dobo, Cary, N.C., assignor to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 319,133, Dec. 29, 1972, Pat. No. 3,811,850. This application Dec. 7, 1973, Ser. No. 422,933
Int. Cl.[2] B21C *37/04;* **B22D** *11/00*
U.S. Cl. 29—193 **3 Claims**



1. A fine diameter cast wire product consisting of an alloy of steel and having a porosity less than 0.06 volume percent.

3,904,382
CORROSION-RESISTANT COATING FOR SUPERALLOYS

Adrian M. Beltran, Ballston Lake; Norman R. Lindblad, Schenectady, and Gerald E. Wasielewski, Rexford, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 17, 1974, Ser. No. 479,853
Int. Cl.[2] B32B *15/04*
U.S. Cl. 29—194 **4 Claims**

1. An oxidation and corrosion resistant composite comprising a superalloy substrate and a coating alloy bonded thereto consisting essentially of the following elements in weight percent:

Chromium - 40-65%
Silicon - 5-12%
Nickel - Balance

3,904,383
WELDED STRUCTURE AND METHOD

Peter C. Murphy, and J. Richard Lawrence, both of Indianapolis, Ind., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

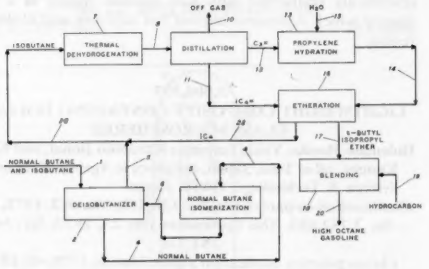
Division of Ser. No. 36,489, May 11, 1970, Pat. No. 3,669,656. This application Apr. 13, 1972, Ser. No. 243,883
Int. Cl.[2] B23K *35/24;* **B29C** *1/02;* **B32B** *15/04;* **C22C** *27/04*
U.S. Cl. 29—196.1 **9 Claims**

4. A welded structure comprising a shaping member of either die steel, a W based alloy, or a Mo based alloy, a weld over the shaping member, the weld consisting essentially of about 50 to about 70 wt.% W, about 10 to about 40 wt.% Ni, about 1 to about 25 wt.% Fe, and 0 to about 5 wt.% per element of an additive selected from Co, Cu, Cr, Ti, Ta, Re, V and Mo, the total additive content being no more than up to about 10 wt.%.

3,904,384
GASOLINE PRODUCTION

Jacob D. Kemp, El Cerrito, and Robert P. Sieg, Piedmont, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 31,300, April 23, 1970. This application Nov. 13, 1972, Ser. No. 306,117
Int. Cl. C10l *1/02*
U.S. Cl. 44—56 **12 Claims**



1. In a process for producing a high-octane gasoline by blending a hydrocarbon mixture of the gasoline range with an ether, the improvement which comprises:

a. producing a mixture comprising propylene and isobutene in which the mol ratio of the isobutene is to propylene is in the range from about 1–1.25 to **1,** respectively, by maintaining a refinery process stream comprising a substantially isobutane feed in a reaction zone at a temperature in the range from about 1125°F. to 1275°F.;

b. separating by distillation said mixture into a propylene-rich stream and an isobutene-rich stream;

c. producing isopropanol by contacting a mixture of the propylene-rich stream and water with a solid acidic hydration catalyst at a temperature in the range from about 100° to about 400°F.;

d. producing t-butyl isopropyl ether by reacting said isopropanol with said isobutene-rich stream by contacting a mixture of said reactants with a solid acidic etheration catalyst in a reaction zone at a temperature between about 50° to 200°F.; and

e. producing a high-octane gasoline by blending said ether with said gasoline-range hydrocarbon mixture.

3,904,385
POLYACRYLATES AND WAXY RESIDUAL FUEL COMPOSITIONS THEREOF

William M. Sweeney, Wappingers Falls, N.Y., assignor to Texaco Inc., New York, N.Y.

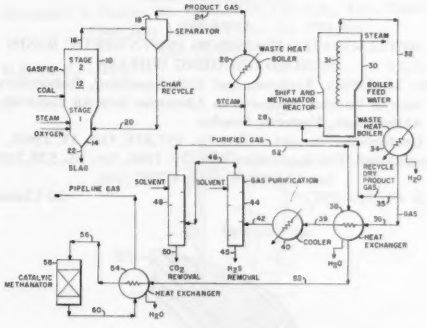
Filed May 8, 1972, Ser. No. 250,900
Int. Cl.[2] C10L *1/18*
U.S. Cl. 44—62 6 Claims

1. A composition comprising a wax containing residual petroleum fuel oil containing between 4 and 15 wt. % macrocrystalline paraffin wax containing a pour depressing amount of an interpolymeric poly(n-alkylacrylate) of a molecular weight between about 3000 and 100,000 wherein the n-alkyl is of at least 18 carbons and at least 70 wt. % of said n-alkyl is of 20 to 24 carbons consisting of between about 2 and 65 wt. % of C_{20} alkyl between about 18 and 65 wt. % C_{22} alkyl and between about 8 and 25 wt. % C_{24} alkyl said poly(n-alkylacrylate) introduced into said oil at a temperature above the solution of said wax.

3,904,386
COMBINED SHIFT AND METHANATION REACTION PROCESS FOR THE GASIFICATION OF CARBONACEOUS MATERIALS

Michael S. Graboski, Stahlstown, Pa., and Ernest E. Donath, St. Croix, V.I., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 26, 1973, Ser. No. 410,118
Int. Cl.[2] C10K *3/02*
U.S. Cl. 48—197 R 8 Claims



1. In a process for gasification of carbonaceous materials to produce high methane content gas, including a water gas shift reaction and a methanation reaction comprising,

gasifying carbonaceous materials and generating a hot synthesis gas comprising a mixture of methane, hydrogen sulfide, hydrogen and oxides of carbon,

cooling said hot synthesis gas,

adding steam to said cooled synthesis gas when the hydrogen to carbon monoxide ratio of said cooled synthesis gas is less than 1.0 to produce a mixture of steam and cooled synthesis gas having a steam/gas ratio of about 0.5,

introducing said cooled synthesis gas into a combined water gas shift and methanation reactor into contact with a catalyst at a temperature between 550°F. and 1050°F. and at a pressure between 500 psig. and 2000 psig. whereby simultaneously the hydrogen/carbon monoxide ratio is increased by carbon monoxide reacting with water produced from the methanation reaction and methanation of carbon monoxide and hydrogen is accomplished, recovering from said reactor a methane rich product gas which includes above 40% by volume methane, said methane rich product gas also including hydrogen sulfide, carbon oxides and other higher hydrocarbons such as ethane and propane,

passing said methane rich product gas through a waste heat boiler to thereby cool and dry said methane rich product gas and thereafter,

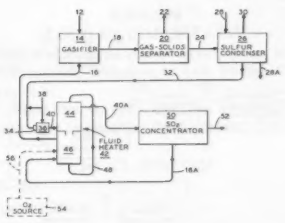
introducing said methane rich gas into a purification unit for removal of acid gas such as hydrogen sulfide and carbon dioxide to produce a purified methane rich product gas, and

recycling a portion of said cooled and dried methane rich product gas for mixture with said mixture of steam and cooled synthesis gas introduced into said combined water gas shift and methanation reactor in an amount which is not more than three volumes for each one volume of said mixture of steam and cooled synthesis gas.

3,904,387
FUEL GAS MANUFACTURE

Norbert J. Kertamus, Alliance; Warnie L. Sage, Louisville, and Mark A. Paisley, Alliance, all of Ohio, assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Aug. 26, 1974, Ser. No. 500,817
Int. Cl.[2] C10J *3/06, 3/54*
U.S. Cl. 48—210 10 Claims



1. A process for converting hot carbonaceous matter to gaseous fuel comprised primarily of carbon monoxide, and including the steps of:

gasifying the carbonaceous matter through direct contact with heated gaseous sulfur oxides to produce a gaseous mixture of carbon monoxide and sulfur,

removing entrained solids from said gaseous mixture,

obtaining said gaseous fuel from the substantially solids-free gaseous mixture by condensing the sulfur through indirect heat exchange with a coolant,

thermally reacting the condensed sulfur in the presence of air to produce a gaseous mixture of sulfur oxides and nitrogen,

separating the sulfur oxides and the nitrogen of said last named gaseous mixture, and

heating the sulfur oxides prior to gasifying said carbonaceous matter.

3,904,388
PROCESS FOR THE PRODUCTION OF A HIGH METHANE CONTENT TOWN GAS

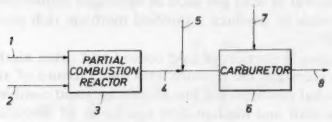
Leonard W. Ter Haar, The Hague, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 22, 1974, Ser. No. 444,930
Claims priority, application United Kingdom, Mar. 19, 1973, 13114/73
Int. Cl.[2] C10K *3/06*
U.S. Cl. 48—212 9 Claims

1. A process for the production of a methane-rich town gas which comprises:

a. partially combusting a carbonaceous fuel to produce a hot gas product having a temperature in the range of about 1150° to about 1700°C;

b. cooling the hot gas product of partial combustion to a temperature in the range of about 650° to about 1100°C by mixing said hot gas product with a cool hydrogen-containing gas to produce a cooled gas having a partial pressure of hydrogen above 4 atmospheres;



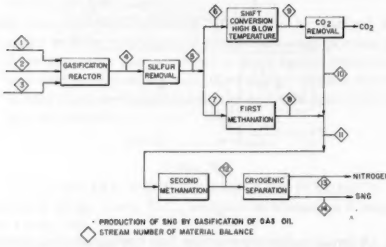
c. carbureting the cooled gas with a volatile hydrocarbon carburant to produce a gaseous product having a high methane content.

3,904,389

PROCESS FOR THE PRODUCTION OF HIGH BTU METHANE-CONTAINING GAS

David L. Banquy, 39 Rue St.-Placide, 75006 Paris, France

Filed Aug. 13, 1974, Ser. No. 497,023
Int. Cl.² C01B 2/14
U.S. Cl. 48—215 **9 Claims**



1. A process for producing a high Btu, methane-rich gas from a suitable carbon- or hydrocarbon-containing feedstock, comprising (a) generating a gaseous effluent having a substantial CO content from said feedstock and purifying said gaseous effluent to remove the impurities therefrom comprising the residual carbon and sulfur impurities; (b) dividing the resulting gaseous effluent into a plurality of fractions; (c) subjecting a first effluent fraction to methanation; (d) subjecting a second effluent fraction to the successive steps of shift conversion and CO_2 removal; (e) mixing the resulting effluents from steps (c) and (d) and subjecting the resulting mixture to methanation; and (f) separating the excess nitrogen present from the methane-rich product.

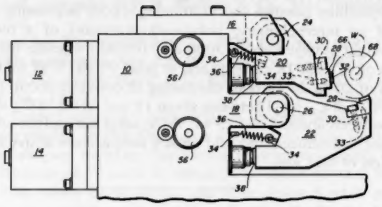
3,904,390

GRINDING MACHINE

Herbert Geoffrey Bottomley, Skipton, England, assignor to Landis Lund Limited, Keighley, England

Continuation-in-part of Ser. No. 447,288, March 1, 1974, abandoned. This application May 13, 1974, Ser. No. 469,515
Claims priority, application United Kingdom, Oct. 10, 1973, 47214/73; Mar. 6, 1973, 10952/73
Int. Cl.² B24B 49/00, 49/02, 9/02
U.S. Cl. 51—165.8 **7 Claims**

1. A cylindrical grinding machine comprising
means for supporting a workpiece for rotative displacement about the axis thereof,
a grinding wheel assembly including at least one grinding wheel and means for rotatively displacing said grinding wheel about the axis thereof,
a workrest including
an upper workrest jaw, and
a lower workrest jaw,
first means including a first stepping motor for incrementally advancing said grinding wheel,
second means including a second stepping motor for incrementally advancing said upper workrest jaw,
third means including a third stepping motor for incrementally advancing said lower workrest jaw, and



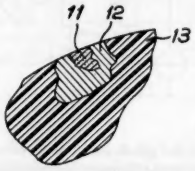
means for conjointly supplying pulses to said first, second and third stepping motors at predetermined rates when said upper workrest jaw, lower workrest jaw and grinding wheel are located at first positions a selected distance from the nondeflected axis of the rotating workpiece to incrementally advance said grinding wheel, and upper and lower workrest jaws to advanced positions a predetermined distance from the non-deflected axis of the rotating workpiece.

3,904,391

METAL-COATED DIAMONDS IN SYNTHETIC RESIN BONDED GRINDING WHEELS

Olle Lindstrom, Vasteras, and Erik Lundblad, Robertsfors, both of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Continuation-in-part of Ser. No. 497,810, Oct. 19, 1965, abandoned. This application Mar. 29, 1966, Ser. No. 538,335
Int. Cl.² C09K 3/14; C23C 5/00
U.S. Cl. 51—295 **10 Claims**



1. A grinding wheel having a hub portion and a diamond section secured on the hub portion, said diamond section comprising a body of cured synthetic resin bond having embedded therein diamonds coated with a layer of metallic material, said layer having a thickness of between 0.5 and 25 microns.

3,904,392

METHOD OF AND APPARATUS FOR DEBUBBLING LIQUIDS

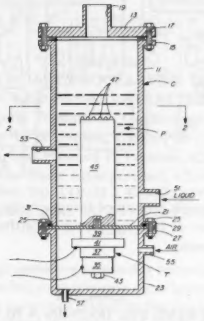
Jack A. VanIngen; Roger H. Maddocks, and Arthur L. Carter, all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 16, 1973, Ser. No. 342,010
Int. Cl.² B01D 51/08
U.S. Cl. 55—15 **7 Claims**

1. Apparatus for debubbling a liquid comprising, in combination,

a closed container having inlet and outlet for liquid;

an acoustic horn projecting up from the bottom of said container into a lower portion thereof in position to be immersed in a pool of said liquid, said horn having a non planar irregular free end surface having a plurality of



projections or cavities therein located at about a first antinode of longitudinal vibration of said horn;

means for energizing said horn to vibrate rapidly; and

vacuum forming means in communication with an upper portion of said container at a position above the surface of such a pool of liquid for creating a vacuum therein.

3,904,393

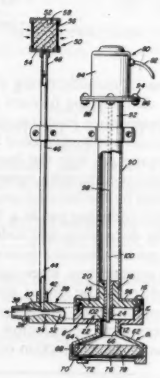
VENTURI-TYPE WATER AERATOR

Raymond A. Morse, Rt. 1, Box 229, Ore City, Tex. 75683

Filed July 13, 1973, Ser. No. 378,895

Int. Cl. B01f *3/04*

U.S. Cl. 55—228 **4 Claims**



1. For environmental life promoting use in a water-filled live box, a minnow bucket, lobster tank, aquarium, or the like; a filtering-type aerator comprising, a centrifugal pump unit embodying a housing having a depending axial water inlet neck and a complemental peripheral water discharge neck, a rotatable bladed impeller operably confined in said housing and provided with a centralized driven hub, a self-standing base unit for said pump unit aligned with and cooperatively located in a plane below the plane of said housing, said base unit embodying a hollow casing having a water intake provided with oriented filtering media and also having an axial upstanding neck communicatively coupled to said water inlet neck, an electric motor embodying a vertical casing having an outstanding endless bottom flange, a vertically elongated drive shaft having its upper end connected to and operated by said motor and having a lower end aligned with and connected to said hub, said pump housing having an upstanding bearing lined with a bushing, the lower end of said shaft being journaled for rotation in said bushing, a vertically elongated motor elevating and supporting sleeve surrounding and protectively enclosing said shaft, said sleeve interposed between said motor casing and pump housing and having an upper end provided with an outstanding first flange oriented with, abutting and separably fastened to the aforementioned bottom flange and also having a second flange at a lower end superimposed upon and separably fastened atop said pump housing, a fitting constituting a venturi-type adapter and having one end communicatively connected to the aforementioned peripheral discharge neck and provided with an aerated water discharging nipple at its other end, said adapter fitting having an open-ended passage with a median venturi restriction provided with a coordinating air inlet orifice, and atmospheric air filtering water aerating means having a vertically elongated air delivering tube communicatively joined with said air inlet orifice whereby air descending said tube is picked up, entrained and mixed with the pressurized stream of water prior to being discharged by way of said nipple.

3,904,394

COLD TRANSPORT LINE

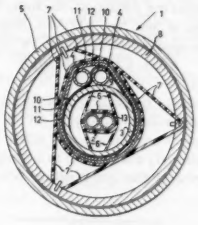
Gijsbert Prast, and Marten Willem Schuiteman, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 9, 1973, Ser. No. 404,360

Claims priority, application Netherlands, Oct. 21, 1972, 7214296

Int. Cl. F17c *7/02*

U.S. Cl. 62—55 **10 Claims**



1. A cold transport line comprising first tube means for cold transport medium, a radiation shield surrounding said first tube means with a first annular space defined between said shield and first tube means, first flexible wire means of low heat-conductivity engaging and suspending said first tube means within said shield, second tube means for cooling medium situated outside and parallel to said shield and in thermal contact therewith, a vacuum jacket formed as a flexible tubular bellows surrounding said shield with a second annular space defined between said jacket and shield, second flexible wire means of low heat-conductivity engaging and suspending said shield within said jacket, said first and second tube means, radiation shield and jacket made of synthetic material, and sealing means closing the ends of said jacket about said first and second tube means and shield for defining said vacuum space therein.

3,904,395

2-IMINO DERIVATIVES OF SUBSTITUTED IMIDAZOLES

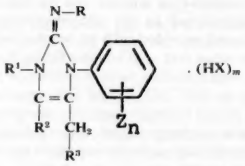
Gary L. Eilrich, Creve Coeur, and William D. Dixon, Kirkwood, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 329,787, Feb. 5, 1973,. This application Nov. 18, 1974, Ser. No. 524,586

Int. Cl.[2] A01N 9/22

U.S. Cl. 71—92 20 Claims

1. A method of regulating the natural growth or development of dicotyledonous plants which comprises applying to said plant an effective plant-regulating amount of a compound of the formula



wherein:

R is lower alkyl or lower alkoxy lower alkyl;

R^1 is lower alkyl;

R^2 is lower alkyl or hydrogen;

R^3 is lower alkyl or hydrogen;

Z is fluoro, chloro, bromo, lower alkyl, halo lower alkyl or lower alkoxy;

n is an integer 0 through 2;

m is an integer 0 or 1; and

X is an anionic moiety of a strong acid.

3,904,396

HERBICIDAL MIXTURE OF SEVERAL CARBAMOYLOXYPHENYLCARBAMATES

Dr. Gerhard Boroschewski, Berlin; Dr. Friedrich Arndt, Aich, and Dr. Alfred Czyzewski, Wolfenbuttel, all of Germany, assignors to Schering Aktiengesellschaft, Berlin, Germany

Continuation of Ser. No. 127,395, March 23, 1971, abandoned. This application Sept. 14, 1973, Ser. No. 397,499

Int. Cl.[2] A01N 9/20

U.S. Cl. 71—111 1 Claim

1. A composition consisting essentially of a herbicidal amount of an admixture of methyl N-(N′-3′-methylphenylcarbamoyloxyl)phenyl) carbamate and ethyl N-3(N′-3′-phenylcarbamoyloxy)phenyl) carbamate in a weight to weight ratio of 1:1, the balance of the composition being an inert diluent or carrier.

3,904,397

METHOD FOR REDUCING METAL ORES

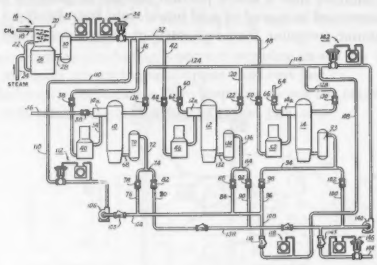
Juan Celada; Patrick W. MacKay; Enrique Ramon Martinez; Antonio Villasenor, and Ricardo Viramontes, all of Monterrey, Mexico, assignors to Fierro Esponja, S.A., Monterrey, Mexico

Filed July 3, 1972, Ser. No. 268,820

Int. Cl. C21b 13/14

U.S. Cl. 75—35 16 Claims

1. In a method for the batchwise gaseous reduction of metal oxides to metals in a multiple unit reactor system of the type in which separate bodies of metal-bearing material are simultaneously treated in a plurality of reactors and a reducing gas is passed successively through reactors of said system, the improvement which comprises feeding a preformed hot reducing gas largely composed of carbon monoxide and hydrogen and at a temperature of 900° to 1100°C. through a body of metal oxide in a reduction reactor of said system to reduce said metal oxide at least partially to sponge metal, cooling the effluent gas from said reduction reactor, reheating a portion of said cooled effluent gas to a temperature of 900° to 1100°C. and recirculating it through said reduction reactor to form a reduction gas circuit, and passing the remainder of said cooled



effluent gas through a body of largely reduced metal oxide in a cooling reactor of said system to cool the body of reduced metal oxide therein.

3,904,398

MANUFACTURING PIG IRON IN A BLAST FURNACE

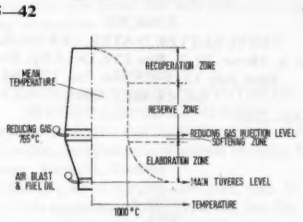
Alfred Decker, Embourg, Belgium, assignor to Centre de Recherches Metallurgiques - Centrum voor Research in de Metallurgie, Brussels, Belgium

Filed Aug. 22, 1973, Ser. No. 390,382

Claims priority, application Belgium, Aug. 22, 1972, 787866

Int. Cl.[2] C21B 5/00

U.S. Cl. 75—42 9 Claims



1. In the process of manufacturing pig iron in a blast furnace, comprising charging the furnace with a burden of iron ore and solid carbonaceous material, the burden descending in the furnace through a softening zone and a fusion zone, and injecting hot reducing gas into the burden above the fusion zone: the improvement comprising measuring the temperature of throat gas yielded by the furnace; and controlling the temperature of said hot reducing gas as a function of said throat gas temperature by decreasing said reducing gas temperature when said throat gas temperature increases and by increasing said reducing gas temperature when said throat gas temperature decreases, whereby the throat gas temperature is kept between the dewpoint of the throat gas and 300°C., the hot reducing gas temperature being below that prevailing in the furnace at the place where injection occurs.

3,904,399

METHOD FOR REFINING PIG IRON INTO STEEL

Crawford B. Murton, 1906 Brushcliff Rd., Pittsburgh, Pa. 15221

Filed Nov. 5, 1973, Ser. No. 412,563

Int. Cl. C21c 5/28

U.S. Cl. 75—51 29 Claims

1. A method of refining molten metal containing oxidizable elements in a metallurgical vessel comprising:

a. blowing an oxygen stream into the molten steel bath of create an oxygen-rich zone therein,

b. then introducing into the oxygen-rich zone a sufficient amount of an oxide of at least one of the oxidizable ele-

ments present in the molten bath in amounts sufficient to provide high concentration of the oxide in the oxygen-rich zone and thereby to maintain the oxidizable element at the desired analysis, and

c. continuing to blow oxygen and to introduce said oxide until the analyses of other oxidizable elements have reached desired analyses.

3,904,400
SEGREGATION ROAST PROCESS FOR THE RECOVERY OF NICKEL FROM LATERITIC ORE

Theodoor W. Zegers; William M. Goldberger, both of Columbus, Ohio; Tage L. B. Jepsen, Gabbs, Nev.; Harley C. Lee, Shaker Heights, and Edward P. Pearson, Cleveland, both of Ohio, assignors to Basic Incorporated, Cleveland, Ohio

Continuation of Ser. No. 119,411, Feb. 26, 1971, abandoned. This application June 18, 1973, Ser. No. 370,691

Int. Cl.[2] C22B *23/02*

U.S. Cl. 75—82 **5 Claims**

1. In a roast segregation process for recovering nickel concentrate from lateritic ores wherein a carbonaceous reductant and a chloridizing agent are added to the ore to be treated and a reducing atmosphere is present over the ore, the improvement in combination therewith, comprising a method of maintaining the atmosphere conducive to reduction and for overcoming the adverse effect on the amount of nickel recovered due to the velocity of gas flowing over the ore during roasting said method comprising:

roasting the ore at a temperature in the range of 1600°F to 2000°F;

producing a flow of reducing atmosphere comprising a mixture of CO and CO_2 over the ore during roasting to produce a calcine containing nickel concentrate;

providing a reducing gas comprising CO and CO_2 having a ratio of CO to CO_2 at which FeO is stable;

controlling the composition of the atmosphere flowing over the ore by injecting into the atmosphere the reducing gas provided for maintaining the ratio of CO to CO_2 in the atmosphere at least a* 0 25 and within the range at which FeO is stable, and

treating the calcine nickel concentrate to recover a higher percentage nickel containing concentrate therefrom.

3,904,401
CORROSION RESISTANT AUSTENITIC STAINLESS STEEL

David L. Mertz, Fleetwood, and Robert L. Caton, Reading, both of Pa., assignors to Carpenter Technology Corporation, Reading, Pa.

Filed Mar. 21, 1974, Ser. No. 453,352

Int. Cl. C22c *39/26, 39/48, 39/54*

U.S. Cl. 75—125 **10 Claims**

1. A corrosion resistant austenitic stainless steel alloy which is substantially fully austenitic and nonmagnetic in its annealed condition and in its cold worked condition, consisting essentially in weight percent of about

Carbon	0.25 Max.
Manganese	15–20
Silicon	1 Max.
Phosphorus	0.05 Max.
Sulfur	0.5 Max.
Chromium	16–22
Nickel	3 Max.
Molybdenum	0.5–3
Copper	0.5–2
Boron	0.01 Max.
Nitrogen	0.2–0.8

the balance being essentially iron and incidental impurities, in which up to 0.75 percent selenium can be substituted for all or part of the sulfur, and in which tungsten can be substituted for all or part of the molybdenum in the proportion of 1.5 percent tungsten for 1 percent molybdenum.

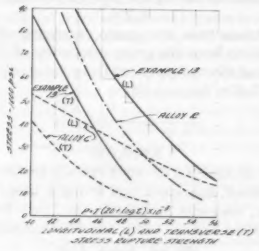
3,904,402
COMPOSITE EUTECTIC ALLOY AND ARTICLE

Russell W. Smashey, Loveland, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed June 1, 1973, Ser. No. 366,047

Int. Cl. C22c *19/00*

U.S. Cl. 75—170 **14 Claims**



1. An article of manufacture having an improved combination of stability and high temperature properties comprising a unidirectionally solidified anisotropic metallic composite body comprising:

a matrix of a Ni-base or Co-base superalloy consisting essentially of, by weight, about 2- 9% Re and less than about 0.8% Ti, along with elements selected from the group consisting of Cr, Al, Ta, C, Ni, Co, W, V, Mo, Cb, Hf, Zr and B, the matrix being a solid solution; and

an aligned eutectic reinforcing fibrous phase selected from carbides of the group consisting of Ta, V and their alloys and mixtures embedded in the matrix.

3,904,403
HEAT RESISTING NICKEL-ALUMINUM-MOLYBDENUM ALLOY

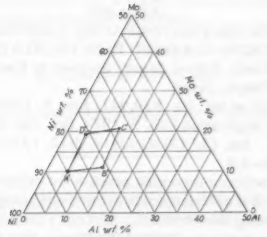
Noboru Komatsu; Takatoshi Suzuki; Nobuyuki Yamamoto, and Yukikazu Tsuzuki, all of Nagoya, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Japan

Filed Dec. 5, 1973, Ser. No. 421,971

Claims priority, application Japan, Dec. 14, 1972, 47-125937

Int. Cl.[2] C22C *19/03*

U.S. Cl. 75—170 **15 Claims**



1. A heat resisting alloy which has excellent mechanical strength, toughness and oxidation resistance at elevated temperatures in the range of 1,000°–1,200°C, said alloy consisting essentially of 93–98.9 atomic percent of a basic constituent comprising nickel, aluminum and molybdenum in the following atomic percents of the basic constituent, nickel 62–83%, aluminum 11–26%, and molybdenum 6–12%; 0.1–3 atomic percent of a second constituent consisting of at least one element selected from a group consisting of titanium, chromium, zirconium, niobium, tantalum and tungsten; and 1–4 atomic percent silicon.

3,904,404
RHODIUM AND RUTHENIUM COMPOSITIONS

James Carr Suits, Saratoga, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 9, 1975, Ser. No. 539,657
Int. Cl.[2] C22C 5/04
U.S. Cl. 75—172 R 10 Claims

1. A composition having the general formula

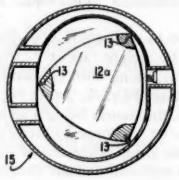
$$R_2TX$$

where R is taken from the group consisting of Rh and Ru; where T is taken from the group consisting of Fe, Co, Ni, V, Cr and Cu; and where X is taken from the group consisting of Al, Ga, In, Tl, Ge, Sn, and Sb.

3,904,405
SLIDING SEAL PARTS AND PROCESS OF MAKING

Robert A. Russell, Rosemont, and Irving J. Hess, Philadelphia, both of Pa., assignors to Ametek, Inc., New York, N.Y.

Filed Feb. 2, 1973, Ser. No. 328,926
Int. Cl.[2] C22C 1/04
U.S. Cl. 75—201 6 Claims



1. The process of producing sliding seal part means comprising the steps of adheringly plating discrete carbon elements with aluminum, then consolidating said plated elements into sliding seal part means by pressure and heat, wherein the plating is carried out by electrodeposition from an ethereal bath containing anhydrous aluminum chloride and a metal hydride selected from the group consisting of lithium hydride and lithium aluminum hydride.

3,904,406
ELECTROPHOTOGRAPHIC PROCESS OF TRANSFERING COLORED ELECTROSTATIC IMAGES

Toru Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 830,947, June 6, 1969, abandoned. This application Feb. 5, 1974, Ser. No. 439,949
Int. Cl.[2] G03G 13/14, 5/12, 13/01
U.S. Cl. 96—1.4 13 Claims

1. An electrophotographic process for copying an original comprised of *n* different color contents, *n* being a whole integer, comprising the steps of:

a. forming separate electrostatic images on a photosensitive member, each said electrostatic image corresponding to a different one of said *n* different color contents of said original;

b. developing each said electrostatic image with a developing agent corresponding to the color content of said original involved in said forming of said electrostatic image;

c. applying each such developed image to the same expanse of a non-elastic image transfer member to form a multicolor image thereon; and

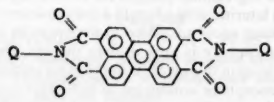
d. transferring said multicolor image to a recording member.

3,904,407
XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS

Paul J. Regensburger, Webster, and James J. Jakubowski, Rochester, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 93,974, Dec. 1, 1970, abandoned, which is a continuation-in-part of Ser. No. 14,461, Feb. 26, 1970, abandoned. This application Dec. 18, 1972, Ser. No. 315,959
Int. Cl.[2] G03G 5/04
U.S. Cl. 96—1.5 20 Claims

1. An electrophotographic plate having a photoreceptor binder layer consisting essentially of photosensitive particles in an amount of from about 0.1 to 5% by volume of said binder, said binder and particles being compatible so as to support efficient photogenerated charge injection from said photosensitive particles, said photosensitive particles comprising a pigment selected from the class of perylene pigments of the formula



wherein the groups represented by Q are alkyl, aryl, alkylaryl, alkoxyl, halogen or heterocyclic substituent, and said active transport binder consisting essentially of a transport material selected from the group consisting of electron transport and hole transport materials, said binder material being capable of supporting the injection and transport of photogenerated charges from said photosensitive particles through said binder material and being substantially transparent in the wavelength region of from about 4,200 to 6,500 A.

3,904,408
ELECTROPHOTOGRAPHIC MEMBER WITH GRADED TELLURIUM CONTENT

Hiroshi Hanada, Yokohama; Nobuo Kitajima, Akishima, and Tatsuo Masaki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

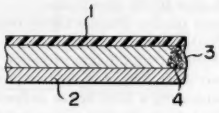
Continuation of Ser. No. 87,470, Nov. 6, 1970, abandoned. This application Feb. 5, 1973, Ser. No. 329,890
Claims priority, application Japan, Nov. 14, 1969, 44-91543; Mar. 5, 1970, 45-18922; Mar. 9, 1970, 45-19932; Mar. 18, 1970, 45-22925
Int. Cl.[2] G03G 5/04
U.S. Cl. 96—1.5 22 Claims

1. An electrophotographic photosensitive member consisting essentially of a base composed of an electrically-conductive material or an electrically insulating material wherein the surface which contacts a photoconductive layer is electrically conductive, a photoconductive layer on the base, and an electrically insulating layer on the photoconductive layer, wherein the photoconductive layer consists of a single layer composed of Te and Se, or Te, Se and As evaporated onto the base at a temperature of at least 63°C., and wherein the Te content in the photoconductive layer is equal to or less than 6% by weight at the side of the photoconductive layer nearer the base and progressively increases in the direction of thickness toward the side of the photoconductive layer near the electrically insulating layer.

3,904,409
PHOTOCONDUCTIVE BODY FOR ELECTROPHOTOGRAPHY AND THE METHOD OF MANUFACTURING THE SAME

Hiroshi Hanada, Yokohama, and Toru Takahashi, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 4, 1969, Ser. No. 804,142
Claims priority, application Japan, Mar. 6, 1968, 43-15287
Int. Cl.[2] G03G *5/087*
U.S. Cl. 96—1.5 25 Claims



1. A photoconductive powder comprising a photoconductive core and a first photoconductive coating, said core exhibiting n-type semiconductivity, said first coating covering said core and exhibiting p-type semiconductivity.

2. A photosensitive member comprising the photoconductive powder claimed in claim 1 and a binder therefor.

3. The photosensitive member claimed in claim 2 in which the photosensitive member is a photoconductive layer and including further an overlying insulative layer.

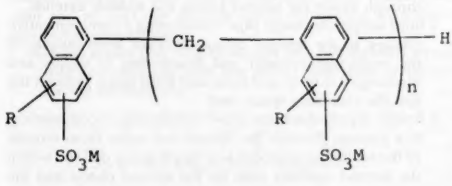
3,904,410
ELECTROPHOTOGRAPHIC COPYING PAPER

Kahei Sakaguchi; Noboru Moriyama, and Hirotaka Takemoto, all of Wakayama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Dec. 10, 1973, Ser. No. 423,112
Claims priority, application Japan, Dec. 19, 1972, 47-127473
Int. Cl. G03g *5/04*
U.S. Cl. 96—1.5 10 Claims

1. In an electrophotographic copying paper comprising a support having on one surface thereof a photoconductive layer comprising a mixture of photoconductive substance and a film-forming resin binder, the improvement which comprises:

said surface of said support has applied thereon, underneath said photoconductive layer, a coating of naphthalenesulfonate formaldehyde condensate of the formula



wherein R is H, CH_3 or C_2H_5, M is Na, K, Li or NH_4, and *n* is an integer of 1 to 20,

in an amount effective to reduce the surface electrical resistance of said support to within the range of 10^6 to 10^9 ohms.

3,904,411
PHOTOIMAGING AND COLOR PROOFING

Floyd B. Erickson; Robert A. Heimsch, both of St. Louis, and Eric T. Reaville, Webster Groves, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Mar. 1, 1971, Ser. No. 119,911
Int. Cl.[2] G03C *11/12, 7/16*
U.S. Cl. 96—28 17 Claims

1. The process of making colored prints which comprises forming a plurality of color separation exposures on photosensitive polymeric coatings on supports, said coatings comprising a solid polymer having carbon-to-carbon double bond unsaturation and a photooxidation photosensitizer capable of absorbing light energy and utilizing same in the presence of oxygen to cause formation of a bond between oxygen and the polymer, applying a liquid to develop images in said coatings by selectively removing either exposed or non-exposed areas from said support, placing one of said images in contact with a backing and removing said support, thereby transferring the part of the coating forming an image from said support to said backing, and thereafter transferring in similar manner another of said images to the first in registered relationship therewith.

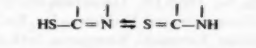
3,904,412
METHOD FOR THE PREPARATION OF PLANOGRAPHIC PRINTING PLATES FROM SILVER IMAGES

Frans Philomena Serrien, Wilrijk; Bernard Hippoliet Tavernier, Edegem; Robert Joseph Pollet, Vremde, and Francis Jeanne Sels, Kontich, all of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Oct. 3, 1973, Ser. No. 402,883
Claims priority, application United Kingdom, Oct. 4, 1972, 45792/72
Int. Cl.[2] G03C *5/54;* G03F *7/02;* B41M *5/00;* B41N *3/00*
U.S. Cl. 96—29 L 10 Claims

1. A method for preparing a planographic printing plate wherein a sheet material comprising an outer hardenable hydrophilic colloid layer on the surface of which is concentrated a silver image which has been formed at that surface from complexed silver halide by silver complex diffusion transfer process is contacted with an aqueous lithographic fixer having a pH-value in the range from about 4.5 to about 6.2 and containing:

1. an iron(III) ammonium salt of an aliphatic dicarboxylic acid which at least superficially oxidizes said silver image,
2. a compound yielding iodide ions for precipitating said silver ions, and
3. an organic heterocyclic nitrogen compound having in a 5- or 6-membered ring a thione group corresponding to the following tautomeric structure:



for rendering said superficial oxidized silver image hydrophobic.

3,904,413
MULTICOLOR PHOTOGRAPHIC ELEMENTS CONTAINING COARSE-GRAIN SILVER HALIDE EMULSIONS

Rowland George Mowrey, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 20, 1972, Ser. No. 307,890
Int. Cl.[2] G03C *1/76*
U.S. Cl. 96—74 18 Claims

1. A photographic element comprising a support having an image dye-providing layer unit comprising a fine-grain silver halide emulsion having associated therewith a color coupler and another dye image-providing layer unit containing a coarse-grain silver halide emulsion which has a mean silver halide grain size at least 50 percent larger than the mean grain

size of said fine-grain emulsion, and associated therewith a color coupler and at least 10 mg./ft.^{2} of a compound different from said color coupler which is a nondiffusible anionic organic polymeric acid having an equivalent weight of at least 100 and less than 800 based on acid groups; and wherein said fine grain emulsion is substantially free of said non-diffusible anionic organic polymer acid compound.

3,904,414

PRECOATED DIAZOTYPE PHOTOCOPYING MATERIALS

Walter J. Welch, Binghamton, N.Y., assignor to GAF Corporation, New York, N.Y.

Continuation of Ser. No. 183,715, Sept. 24, 1971, abandoned. This application July 9, 1973, Ser. No. 377,394

Int. Cl.^{2} G03C *1/60, 1/54*

U.S. Cl. 96—75 **6 Claims**

1. Two component light-sensitive diazo-type photocopying material comprising, on a base sheet, a precoat layer consisting essentially of a polymeric binder, a pigment selected from the group consisting of finely divided silica having an average particle size of from about 1 to 5 microns, aluminum oxide, titanium dioxide, zinc oxide, barium sulfate, and Bentonite clay; and a water-soluble salt selected from the group consisting of magnesium chloride, magnesium sulfate, aluminum chloride, aluminum sulfate, cadmium chloride, and cadmium sulfate, said salt constituting 10–25% by weight of the solids of said precoat layer; and a two-component diazo-type sensitizing composition capable of being developed with ammonia and containing a diazonium compound, an azo-coupler, and an acidic stabilizer coated upon the surface of said precoat layer.

3,904,415

PHOSPHINE SENSITIZED PHOTOGRAPHIC SILVER HALIDE EMULSIONS AND ELEMENTS

Edwin N. Oftedahl, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 29, 1974, Ser. No. 492,956

Int. Cl.^{2} G03C *1/28*

U.S. Cl. 96—107 **21 Claims**

1. A photographic silver halide emulsion comprising photographic silver halide grains, a vehicle for dispersing said silver halide grains and a sensitizing amount of a tris(dialkylamino)-phosphine or a tris(dialkylaminoalkylene)phosphine in which each of the alkyl groups contain at least two carbon atoms and the alkylene group contains from one to three carbon atoms.

3,904,416

MULTISTAGE CYLINDER

Toshiaki Onoda, No. 1865-19,, Tokaichiba-machi, Midori-ku, Yokahama, Kanagawa, and Yoshimasa Ito, No. 1317, Shinsaku, Takatsu-ku, Kawasaki, Kanagawa, both of Japan

Filed Apr. 23, 1973, Ser. No. 353,612

Claims priority, application Japan, Jan. 31, 1973, 48-12708

Int. Cl.^{2} F01B *7/20*

U.S. Cl. 92—52 **1 Claim**

1. A multistage cylinder having at least a first-stage cylinder and a second-stage cylinder, in which: the first-stage cylinder comprises

a first cylinder tube,

a head cover fixed to one end of the first cylinder tube,

a first piston of disc shape slidably disposed within the first cylinder tube,

a first piston rod of tubular shape fixed at one end thereof to the first piston,

a first rod cover fixed to the other end of the first cylinder tube and having a hole through which the first piston rod slidably extends,

a first supply-discharge pipe constituting a communicative passage through the head cover from outside of the multistage cylinder to a first space defined within the first cylinder tube by the head cover and the first piston and functioning to supply and discharge a fluid to and from said first space, and

a second supply-discharge pipe constituting a communicative passage through the first rod cover from outside of the multistage cylinder to a second space defined within the first cylinder tube by the first piston and the first rod cover and functioning to supply and discharge a fluid to and from said second space,

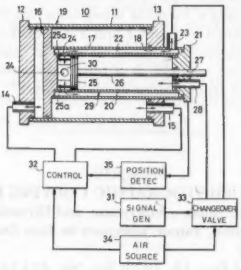
the supply and discharge of the fluid through the first and second supply-discharge pipes being carried out in a mutually interrelated manner; and

the second-stage cylinder comprises

a second cylinder tube disposed within the first piston rod with a specific clearance space therebetween and fixed at one end thereof to the first piston,

a second piston of disc shape slidably disposed within the second cylinder tube,

said second cylinder tube being provided with an opening near the part thereof fixed to the first piston, said opening for communicating a third space defined within the second cylinder tube by the first piston and the second piston with the specific clearance space,



a clearance member for maintaining a clearance between the first and second pistons so that the second piston does not close the opening of the second cylinder tube when the second piston is slid to the closest position to the first piston.

a second piston rod fixed at one end thereof to the second piston,

a second rod cover fixed to the other ends of the first piston rod and the second cylinder tube and having a hole through which the second piston rod slidably extends,

a third supply-discharge pipe constituting a communicative passage to the specific clearance space from outside of the multistage cylinder and functioning to supply and discharge a fluid to and from said third space through the specific clearance space, and

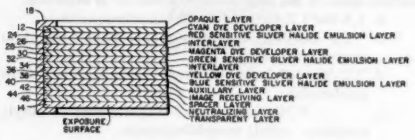
a fourth supply-discharge pipe constituting a communicative passage through the second rod cover from outside of the multistage cylinder to a fourth space defined within the second cylinder tube by the second piston and the second rod cover and functioning to supply and discharge a fluid to and from said fourth space,

the supply and discharge of the fluid through the third and fourth supply-discharge pipes being carried out in a mutually interrelated manner and in an individual manner with respect to the first and second supply-discharge pipes.

3,904,417
COLOR DIFFUSION TRANSFER DYE IMAGE-FORMING MATERIAL BINDER LAYERS CONTAINING A WATER-OLUBLE CELLULOSE SALT

Peter O. Kliem, Weston, and Jerome L. Reid, Wayland, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 11, 1973, Ser. No. 423,669The portion of the term of this patent subsequent to Dec. 12, 1989, has been disclaimed.
Int. Cl.² G03C *7/00, 5/54, 1/76;* **G03G** *3/00*
U.S. Cl. 96—73 **4 Claims**



1. A photographic film unit, adapted to be exposed and processed to produce a color diffusion transfer image, comprising:

a plurality of layers including at least one composite photosensitive unit comprising a light-sensitive silver halide layer and, in contiguous planar relationship thereto, a layer comprising a select associated diffusion transfer dye image-forming material dispersed in a matrix comprising gelatin and sodium cellulose sulphate;

receptor means including a layer adapted to receive diffusion transfer dye-image forming material diffusing thereto as a function of the point-to-point degree of said photosensitive unit's exposure to incident actinic radiation;

means incorporated with said film unit for selectively providing processing composition intermediate said receptor means and said plurality of layers; and

means defining a dimentionally stable support for said plurality of layers.

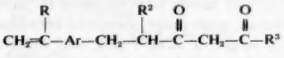
3,904,418
HARDENABLE VEHICLES FOR SILVER HALIDE EMULSIONS

Rowland George Mowrey, and Ignazio Salvatore Ponticello, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 15, 1974, Ser. No. 497,804
Int. Cl.² G03C *1/76, 1/48, 1/78, 1/72*
U.S. Cl. 96—73 **28 Claims**

1. A photographic element comprising a support having coated thereon at least one photographic silver halide emulsion and at least one binding agent comprising an addition interpolymer comprising

A. from about 1 to 50% by weight of a polymerized monomer containing at least one active methylene group and having the formula



wherein Ar is arylene, R is hydrogen or methyl, R^2 is hydrogen, alkyl, aryl, or cycloalkyl, R^3 is alkoxy or amino when *n* is equal to 0, and R^3 is alkyl, alkoxy, amino, cycloalkyl, or aryl when *n* is equal to 1; and

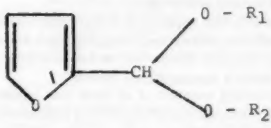
B. from 50 to about 99% by weight of at least one additional polymerized ethyleneically unsaturated monomer.

3,904,419
NON-SILVER SALT PHOTOSENSITIVE MATERIALS

Harumi Katsuyama, Minami-ashigara, and Hisatake Ono, Saitama, both of Asaka, both of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

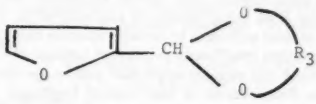
Filed May 25, 1973, Ser. No. 364,167
Claims priority, application Japan, May 26, 1972, 47-52264; June 8, 1972, 47-57105
Int. Cl.² G03C *1/52;* **G03F** *7/02*
U.S. Cl. 96—90 R **12 Claims**

1. Non-silver salt photo-sensitive materials which consist essentially of a light-sensitive layer containing as image-forming components a high-sensitive halo-alkane having a dissociation energy of less than 75 Kcal/mol, a furfurylidene acetal compound of the followiwng formula (IIa) or formula (IIb):



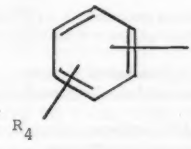
(IIa)

wherein R_1 and R_2 each represents one or two phenyl groups or one or two aralkyl groups, or one or two furfuryl groups;

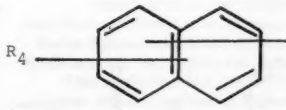


(IIb)

wherein R_3 represents an alkylene group having 2–7 carbon atoms, which can be substituted with a hydroxyalkyl group having 1–4 carbon atoms or an amino group, or may be dimerized by a spiro carbon, and a phenol compound of formulae (IIIa) or (IIIb)



(IIIa)



(IIIb)

wherein *n* is an integer of 1–3, and R_4 represents a hydrogen atom, a halogen atom, an alkyl group of 1–4 carbon atoms, an alkoxy group of 1–4 carbon atoms, a carboxyl group, an alkoxycarbonyl group of '–12 carbon atoms, a formyl group, a sulfo group or an acyl group of 1–4 carbon atoms.

3,904,420

INFORMATION RECEIVING ELEMENT CONTAINING A YELLOW DYE AND AN OPTICAL BRIGHTENER

C. Shelburn Hunter, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 285,398, Aug. 31, 1972, abandoned. This application Sept. 10, 1973, Ser. No. 395,792

Int. Cl.[2] G03C *1/92, 1/94, 1/52*

U.S. Cl. 96—82 26 Claims

1. An information receiving film element for providing a processed, substantially non-fluorescent, optically brightened, substantially transparent information bearing, polymeric film element from which the information processed thereon is substantially non-reproducible when said information bearing film element is placed over a diazo film or print paper and is subjected to exposure to radiation having a wavelength in the range of between about 300 and 460 nanometers, said information receiving film element comprising:

i. a transparent polymeric film support that transmits visible radiation, and which can absorb radiation having a wavelength in the range between about 300 and 460 nanometers, said support having incorporated therein

a. an optical brightening amount of at least one optical brightener compound capable of absorbing radiation in said wavelength range, and

b. a fluorescence and radiation absorbing amount of at least one yellow dye capable of absorbing radiation in said wavelength range, and

ii. at least one radiation sensitive layer, which, when exposed to informaion-providing radiation and processed to develop the information received forms an information bearing transparency, said optical brightener and said yellow dye both being present in said support in a total amount at least sufficient to absorb radiation having said wavelength but insufficient to prevent passage of visible light through the element while said yellow dye also absorbs the fluorescence of said optical brightener both before and after processing of the element to its informatio$_n$ bearing film element form, said optical brightener being a fluorescent compound selected from

a. at least one fluorescent 4,4′-bis-(benzoxazol-2-yl) stilbene compound;

b. 4,4′-bis(4,6-diphenyl-s-triaxin-2-yl)-stilbene;

c. 2,5,bis[5-(α,α-dimethylbenzyl)benzoxazol-2-yl]-thiophene;

d. 7-(2H-naphtho[1,2-d]triazol-2-yl)-3-phenyl-2-chromanone;

e. 6-acetamido-2-butyl phenalene-1,3-(2H)-dione;

f. 6-(4-methyl-5-phenyl-v-triazol-2-yl)-3-phenyl-2-chromanone;

g. 2-(4,6-dimethoxy-2-s-triazinyl)pyrene;

h. phenyl-4-(2H-naphtho[1,2-d]triazol-2-yl)-2-stilbene sulfonate;

i. 4′-(2-benzoxazolyl)-4-stilbene carboxylic acid;

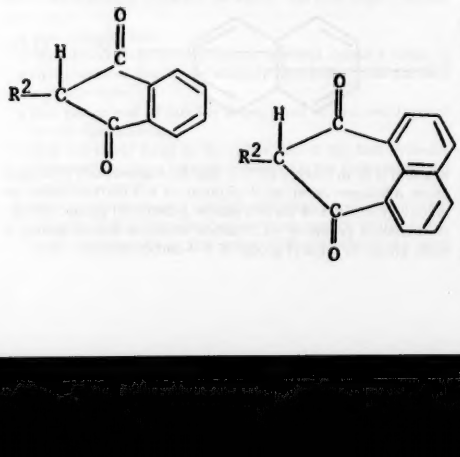
j. 1,4-bis(2-benzoxazolyl)naphthalene;

k. 1,4-bis(5-methoxycarbonyl-2-benzoxazolyl) naphthalene;

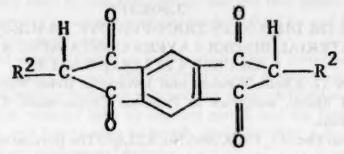
l. methyl-4′-(2-benzoxazolyl)-4-stilbene carboxylate; and

said yellow dye being selected from

a. at least one dyestuff of the following formulas:



or



wherein R^2 is selected from the group consisting of 5 or 6 membered nitrogen-containing heterocyclic rings having a heterocyclic nitrogen atom attached through a double bond to a carbon atom of the ring through which R^2 is attached;

b. 1,5-bis(1,2,4-triazol-5-ylthio)anthraquinone;

c. 2,2′-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]-diethyl sulfone;

d. 2,2′-bis[4(2,2-dicyanovinyl)-N-ethyl anilino]diethyl isophthalate;

e. N,N′-bis[2- 4-(2,2-dicyanovinyl)-N-ethyl-3-toluidino ethyl] terephthalamide;

f. 2,2′-bis[4(2,2-dicyanovinyl)-N-ethyl-3-toluidino]-diethyl succinate;

g. 2,2′-bis[4-(2,2-dicyanovinyl)-N-ethyl-3-toluidino]-diethyl adipate;

h. 2,6-bis(2-quinolyl)-s-hydrindacene-1,3,5,7-tetrone;

i. 2-(2-quinolyl)-1,3-indandione-5,6-dicarboxylic anhydride; and

j. 2-(3-hydroxyquinol-2-yl)-1,3-indandione.

3,904,421

ANTICORROSIVE PAINT

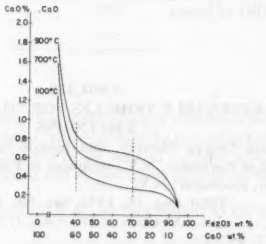
Shigeki Shimizu, Ushitahiga; Wataru Shinoda; Hazime Makino, both of Hiroshima; Hiroyuki Kondo, Huruehigashi, and Katuaki Okikawa, Hiroshima, all of Japan, assignors to Tada Kogyo Ltd., Japan

Filed Aug. 21, 1973, Ser. No. 390,208

Claims priority, application Japan, Aug. 30, 1972, 47-87411; July 27, 1973, 48-85301

Int. Cl. C09d *5/08*

U.S. Cl. 106—14 6 Claims

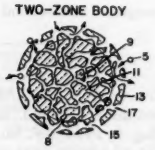


1. In an anticorrosive paint free from lead and chromium pollutants containing a pigment and a vehicle containing a resinous binder and solvent, the improvement comprising, as the anticorrosive pigment of a powder with a PVC value of 45–60 per cent and an average particle size of 0.5 micron - 1 micron, said powder having been prepared by pulverizing an iron oxide-calcium oxide sinter composite containing at least 5 per cent by weight of $2CaO{\cdot}Fe_2O_3$, said sinter composite being obtained by calcining at a temperature of 700° to 1150°C a mixture of 40 to 70 per cent by weight, in terms of iron oxide content, of an iron compound selected from the group consisting of Fe_2O_3, Fe_3O_4 and FeOOH and 30 to 60 per cent by weight, in terms of calcium oxide content, of a calcium compound selected from the group consisting of calcium carbonate, calcium hydroxide and calcium oxide.

3,904,422
POROUS GLASS SUPPORT MATERIAL

David L. Eaton, Big Flats, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 238,258, March 27, 1972, Pat. No. 3,702,987. This application Mar. 30, 1973, Ser. No. 346,608
Int. Cl. C03c *11/00*
U.S. Cl. 106—40 V 6 Claims



1. In a porous glass body comprising a glass having a network of interconnected voids and channels of substantially uniform average pore diameter, the improvement which comprises having two essentially distinct zones of porosity, said two zones of porosity comprising an inner core portion having pores of substantially uniform average pore diameter, and an outer layer having pores of substantially uniform average pore diameter, the average pore diameter of said outer layer being between 100A and 2,500A and the average pore diameter of the core portion being between 20A and 60A.

3,904,423
ALKALI RESISTANT GLASS

Bernard M. Guthrie, Corvallis, Oreg., assignor to Evans Products Company, Portland, Oreg.

Filed Apr. 16, 1973, Ser. No. 351,582
Int. Cl.[2] C03C *13/00, 3/04, 3/08*
U.S. Cl. 106—50 15 Claims

1. Glass composition having a modulus of acidity of between about 1.1 and 2.2 and consisting essentially of the following oxides, expressed in mole percentages:

SiO_2	35–58
ZrO_2	1.5–5
TiO_2	0–12
Al_2O_3	1–12
CaO	5–32
MgO	0–18
ZnO	1–12
SrO	0–5
BaO	0–5
SnO_2	0–10
B_2O_3	3–13.

3,904,424
ALKALI RESISTANT GLASSY FIBERS

Susumu Aoki; Toshiaki Minaki, both of Yokohama, and Kentaro Mori, Tokyo, all of Japan, assignors to Nippon Asbestos Company, Ltd., Tokyo, Japan

Filed May 21, 1973, Ser. No. 362,503
Claims priority, application Japan, June 9, 1972, 47-56836; Dec. 27, 1972, 47-129999
Int. Cl. C03c *3/04*
U.S. Cl. 106—50 2 Claims

1. An alkali-resistant glassy fiber usable as a reinforcing material in calcium silicate-containing molded articles and cement- or gypsum-containing molded articles, which consists essentially of 35 to 50% by weight of SiO_2, 25 to 45% by weight of Al_2O_3, 10 to 19% by weight of ZrO_2 and 3 to 20% by weight of MgO.

3,904,425
ABSORPTIVE GLASS

Robert W. Young, Woodstock, Conn., and Robert E. Graf, Southbridge, Mass., assignors to American Optical Corporation, Southbridge, Mass.

Filed June 12, 1964, Ser. No. 374,811
Int. Cl.[2] C03C *13/00*
U.S. Cl. 106—52 6 Claims

1. A glass material having a calculated oxide composition comprising

	Percent by Weight
Silicon Dioxide (SiO_2)	51.9
Sodium Oxide (Na_2O)	6.5
Potassium Oxide (K_2O)	6.8
Calcium Oxide (CaO)	6.5
Antimony Trioxide (Sb_2O_3)	0.4
Aluminum Oxide (Al_2O_3)	1.4
Zinc Oxide (ZnO)	2.2
Titanium Dioxide (TiO_2)	0.4
Manganese Dioxide (MnO_2)	23.4
Chromium Oxide (Cr_2O_3)	0.5
Total	100.0

a 100 micron thickness of said glass material having an optical density greater than 0.25 at least for light from 0.4 to 0.6 microns wavelength.

3,904,426
PROCESS FOR MANUFACTURING LOW TEMPERATURE SEALING GLASSES

Rudolf G. Frieser, Poughkeepsie; Jimmie L. Powell, and Rao R. Tummala, both of Wappingers Falls, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 5, 1974, Ser. No. 495,014
Int. Cl.[2] C03C *3/10*
U.S. Cl. 106—53 4 Claims

1. A process for manufacturing a sealing glass composition consisting essentially of the following constituents in the following proportions:

	Per cent by weight
PbO	66.0
B_2O_3	14.0
SiO_2	2.0
Al_2O_3	3.5
ZnO	10.5
CuO	2.5
Bi_2O_3	1.5

comprising the steps of: providing a batch of constituents to the above proportion; heating the batch to form a liquid melt while insuring full mixing of the melt, until the batch has attained a temperature of between approximately 1080°C and 1120°C; maintaining the temperature of the melt for a period of 3 to 3½ hours; lowering the temperature of the melt sufficiently to inhibit bubbling of the melt; and thereafter removing the melt.

3,904,427
PROTECTION OF TURBINE CASINGS

Peter Frederick Hawthorne, Birmingham, England, assignor to Foseco International Limited, Birmingham, England

Division of Ser. No. 77,348, Oct. 1, 1970, Pat. No. 3,752,683. This application Jan. 29, 1973, Ser. No. 327,649
Claims priority, application United Kingdom, Oct. 6, 1969, 49044/69; July 2, 1970, 32217/70
Int. Cl.[2] C04B *35/80*
U.S. Cl. 106—55 7 Claims

1. A process of making a shaped article of refractory heat-insulating material comprising a dry composition consisting essentially of an inorganic refractory fibre and a water-soluble inorganic binding agent, which comprises forming a wet or

damp mixture of said refractory fibre and binding agent in a homogeneous relationship, forming the mixture to the desired shape and drying the soformed shape by means of microwave drying to avoid migration of any of the components of the composition to form a shaped article in which said refractory fibre and binding agent are still present in a homogeneous relationship and having uniform hardness, strength and density across the shaped article.

3,904,428

PAVING COMPOSITION AND METHOD FOR MAKING IT

Kenneth E. McConnaughay, P.O. Box 1457, Lafayette, Ind. 47902

Continuation-in-part of Ser. No. 37,982, May 18, 1970, abandoned. This application Mar. 24, 1972, Ser. No. 237,666

Int. Cl. C09d *3/24;* **C08h** *13/00, 17/02*

U.S. Cl. 106—278 **3 Claims**

1. A method of making a paving composition comprising the steps of mechanically milling in a colloid mill a bituminous material selected from the class consisting of asphalt, mixtures of asphalt, tar, and pitch, and a water solution of a gelling agent in the form of a soap to produce a bituminous gel containing from about 83 to about 97 percent bituminous material milled into a colloidal particle size, from about 2 to about 16 percent water, and from about 0.1 to about 11 percent of said gelling agent, said bituminous material being at a temperature of from about 200° to about 260° F and said water solution being at a temperature of from about 65° to about 100° F when they are milled together, and mixing said gel while at a temperature of from about 160° to about 210° F with an aggregate to form a paving composition in which the aggregate is coated with the bituminous material in the gel.

3. A paving composition, comprising a mixture of an aggregate and from 3 to about 8 percent of an oil in water bituminous gel said gel containing from about 83 to about 97 percent of a bituminous material selected from the class consisting of asphalt, mixtures of asphalt, tar, and pitch and milled into a colloidal particle size, from about 2 to about 16 percent water, and from about 0.1 to about 11 percent of a gelling agent in the form of a soap which has been at least partially saponified.

3,904,429

PROCESS FOR PREPARING DRIED, PRECOOKED STARCH PRODUCTS WITH MICROWAVES

Fred Eastman; Bartolo J. Giacobello, both of North Plainfield, and Roger W. Rubens, Somerville, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Jan. 28, 1974, Ser. No. 436,903

Int. Cl.[2] A23L *1/18;* **C13K** *1/08*

U.S. Cl. 127—71 **5 Claims**

1. In a process for preparing dried, precooked starch products comprising the steps of

a. forming a cooked paste of starch and water containing between 25 and 80 percent, by weight, starch solids and

b. drying said paste the improvement of drying said paste by application of microwave energy.

3,904,430

CLEANING PROCESS USING A NON-AZEOTROPE FORMING CONTAMINATED CLEANING MIXTURE

James William Tipping, and Bernard Patrick Whim, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Aug. 24, 1973, Ser. No. 391,258

Claims priority, application United Kingdom, Sept. 7, 1972, 41484/72

Int. Cl. B08b *7/04, 3/00*

U.S. Cl. 134—11 **37 Claims**

1. A method of cleaning a contaminated article which comprises contacting the article with a first contaminated liquid mixture which is heated to at least 30°C., removing contamination from the article and accumulating the removed contamination in the first liquid mixture, said first liquid mixture containing a fluorinated hydrocarbon solvent and an organic auxiliary solvent which together form a non-azeotrope-forming mixture and wherein the concentration of the auxiliary solvent in the mixture is at least 2.5 parts by weight per hundred parts of the fluorinated hydrocarbon solvent, and subsequently rinsing the article with a second liquid non-azeotrope-forming mixture containing the fluorinated hydrocarbon solvent and a proportion of the auxiliary solvent which is lower than that contained in the first liquid mixture, but at least equal to 0.5% by weight of said second liquid mixture.

3,904,431

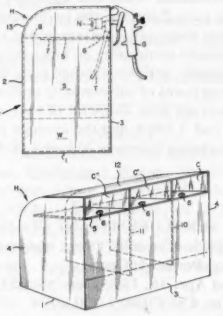
SPRAY-GUN CLEANERS

David Dinerman, 304 Brandywine Rd., Savannah, Ga. 31405

Filed Aug. 8, 1974, Ser. No. 495,805

Int. Cl.[2] B08B *3/00, 9/00*

U.S. Cl. 134—88 **5 Claims**



1. An apparatus for cleaning paint-spray guns, comprising

a. a tank adapted to be supported on a bench or frame and constituted essentially by a closed container for receiving a body of water in the lower portion thereof with a supernatant layer of liquid chemical solvent in the upper portion thereof,

b. an enclosing hood across the top of the tank which is open at the front and closed at the rear whereat it merges with said container,

c. covering means at the upper portion of the tank above the level of the liquid solvent having openings adjacent to the front edge at the open end of said hood, said covering means terminating short of the rear of the hood and tank to provide a passage therebetween,

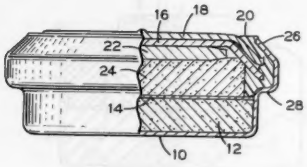
d. at least one vertical partition extending from the front to the back of said tank substantially from the top to a point above the bottom thereof, and below the interface between the water and supernatant chemical solvent, to divide the tank into a plurality of compartments with one of said openings in each compartment,

e. said openings in said covering means adapted to receive successively the suction supply tube of a spray gun for penetration into said body of solvent to enable the spraying of the residual paint in the gun into the compartment portions of the hood with progressively cleaner bodies of the solvent, which fall through said passage while the paint particles settle in the bottom of said tank in the body of water, for eventual removal.

3,904,432
METAL PERMANGANATE AND METAL PERIODATE ORGANIC ELECTROLYTE CELLS

Arabinda N. Dey, Needham, and Robert W. Holmes, Dedham, both of Mass., assignors to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Filed Apr. 19, 1972, Ser. No. 245,510
Int. Cl.² H01M 35/02
U.S. Cl. 136—6 LN 5 Claims

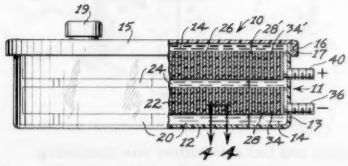


1. An electrochemical energy generating cell comprising (a) at least one positive electrode; (b) at least one negative electrode; (c) an organic electrolyte with said electrodes disposed therein; said positive electrode (a) comprising a cathodic material selected from the group consisting of the permanganates and periodates of heavy metals from the group consisting of copper, silver, iron, cobalt, nickel, mercury, thallium, lead, and bismuth, and mixtures thereof; said negative electrode (b) comprising an active light metal selected from the group consisting of lithium, sodium, potassium, beryllium, calcium, magnesium, and aluminum and alloys thereof; and said organic electrolyte (c) comprising a polar organic solvent having dissolved therein at least one ion-forming salt of an active light metal.

3,904,433
STORAGE BATTERY HAVING SPIRAL ELECTRODES

Wallace N. Frazier, 111 Richland Ave., Smyrna, Tenn. 37176

Filed Oct. 29, 1974, Ser. No. 518,258
Int. Cl.² H01M 35/04
U.S. Cl. 136—14 7 Claims

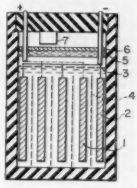


1. A storage battery comprising:
a. an electrically insulated housing adapted to receive an electrolyte,
b. first and second cells within said housing,
c. each of said cells comprising an elongated electrode plate and an elongated insulator strip, said plate and strip being spirally coiled about a common axis,
d. intermediate spacer means separating said first and second cells coaxially of each other to form a space between said cells,
e. an electrolyte within said space and in electrical communication with both said cells,
f. a first terminal electrically connected to the electrode plate in said first cell, and
g. a second terminal electrically connected to the electrode plate in said second cell.

3,904,434
SEALED LEAD STORAGE BATTERY

Satoshi Sekido, Kyoto; Sadau Fukuda, Daito; Masao Matsumoto, Chigasaki, and Kaoru Murakami, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 14, 1972, Ser. No. 306,407
Claims priority, application Japan, Nov. 17, 1971, 46-92632; Nov. 17, 1971, 46-92633
Int. Cl. H01m 1/08
U.S. Cl. 136—26 6 Claims



1. A sealed lead storage battery, comprising a negative electrode active material including lead having an equilibrium potential electrochemically more negative than hydrogen potential and a positive electrode active material including lead oxide, the discharge capacity of said negative electrode active material being greater than that of the positive electrode active material, the excess capacity being previously discharged and simultaneously a meniscus zone including a three-phase zone of a gas phase-liquid phase-solid phase for vanishment of oxygen being formed on the negative electrode active material, and a gas phase reaction catalyst for reacting oxygen gas and hydrogen gas generated from the negative electrode active material for such vanishment being provided in a space formed on an acid gelled electrolyte, and wherein the relation of the gas phase reaction rate of said gas phase reaction catalyst>the oxygen vanishing rate at said negative electrode active material>the oxygen generating rate from said positive electrode active material is maintained.

3,904,435
MULTI-MODE THERMAL BATTERY

Asaf A. Benderly, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 2, 1973, Ser. No. 385,211
Int. Cl.² H01M 6/30
U.S. Cl. 136—90 5 Claims

1. A thermal cell comprising: (1) electrodes; (2) at least one salt disposed between said electrodes, said salt being solid and capable of providing a low, but useful, ionic conductivity at ambient temperatures and becoming a strong ionic electrolyte upon thermal activation, said salt being selected from the group consisting of silver-rubidium iodide, lithium iodide, lithium tungstate, alkyl ammonium iodide, and mixtures thereof; and (3) means contained in the cell for supplying a sufficient amount of heat to thermally activate said solid salt thereby causing said salt to become a strong ionic conductor.

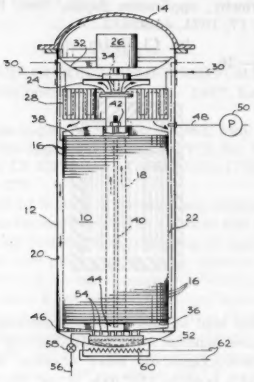
3,904,436
METHOD AND MEANS FOR ACTIVATING A CLOSED BATTERY

Ronald Cercone, Pawcatuck, and Edward S. Dennison, Waterford, Conn., assignors to Electrochem, Inc., New York, N.Y.

Filed Oct. 11, 1973, Ser. No. 405,663
Int. Cl.² H01M 6/32
U.S. Cl. 136—90 13 Claims

1. A method of activating closed batteries, which method comprises reducing the pressure to below atmospheric in a closed inactive battery containing solid hygroscopic electro-

lyte, and releasing water vapor in said battery while said pressure is in a reduced state and maintaining said water vapor in



said battery until at least a battery activating portion of said electrolyte is dissolved by said vapor.

3,904,437

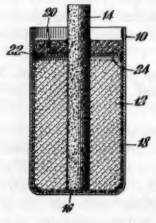
SEPARATOR FOR ZINC CHLORIDE CELLS

Robert A. Specker, Lakewood, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Sept. 21, 1973, Ser. No. 399,320

Int. Cl.[2] H01M *2/16, 6/04*

U.S. Cl. 136—103 **6 Claims**



1. A primary zinc chloride dry cell comprising a zinc anode; a cathode depolarizer mix cake containing manganese dioxide, a carbonaceous conductive material, and an electrolyte; and a separator interposed between said anode and said cathode depolarizer mix and also containing a portion of said electrolyte, said electrolyte consisting essentially of an aqueous solution containing zinc chloride, said separator comprising a paper substrate, from about 5 to 30 per cent by weight of cross-linked polyacrylamide, coated on at least one side of said paper substrate, said coating including from about 70 to 95 per cent by weight of a mixture of talc and starch in a ratio of about 0.2 to 6.0 parts by weight of talc to 1.0 part by weight of starch, said cross-linked polyacrylamide serving as a binder for said mixture of talc and starch.

3,904,438

CLOSURE FOR ELECTROCHEMICAL CELLS

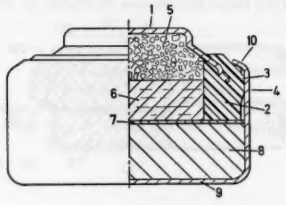
Denis Naylor, and Frederick James Harris, both of Crawley, England, assignors to Mallory Batteries Limited, Crawley, England

Filed Apr. 8, 1974, Ser. No. 459,077

Claims priority, application United Kingdom, Apr. 9, 1973, 17010/73

Int. Cl. H01m *1/02*

U.S. Cl. 136—133 **12 Claims**



1. An electrochemical cell having a metal housing, a metal top, and a resilient sealing ring compressed between the edge region of the top and the internal surface of the housing, which edge ring embraces the edge region of the top, and has a peripheral annular projection on its radially outer surface which projection engages the internal surface of the housing whereby the compressive sealing forces in the ring are localized in an annular region of the ring.

3,904,439

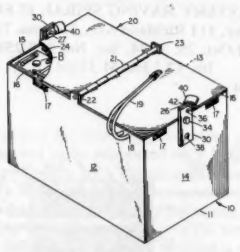
SAFETY AND LOCKED SPARK PROOF BATTERY BOX

James H. Barrett, Jr., 3863 Surrey Rd., Toledo, Ohio 43615

Filed July 11, 1974, Ser. No. 487,778

Int. Cl. H01m *1/04*

U.S. Cl. 136—171 **13 Claims**



1. A safety and lockable battery box comprising:

A. an open top box having four side walls with a substantially planar top edge,

B. a removable cover for closing said box, the pheriphery of which cover engages said top edge of said side walls, and

C. a pair of movable lugs attached to an opposite pair of side walls near their top edges, said lugs having three apertures therein:

a. a first for movable attachment to said side walls,

b. a second for engagement with a grappling hook for lifting the box, which aperture is movable above and below the top edge of said side walls for engagement and non-engagement by a grappling hook, respectively, and

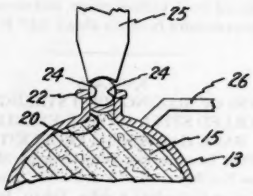
c. a third aperture smaller than that for said grappling hook for movement above the top of said side walls for the bail of a padlock for locking said cover on said box and maintaining said second aperture below said top edge of said side walls.

3,904,440

METHOD OF SEALING AN APERTURE IN A METALLIC SURFACE AND BATTERY EMPLOYING AN APERTURE SEAL

Heinrich J. Hess, Nidau, Switzerland, and Gasper Pagnotta, Rexford, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 291,805, Sept. 25, 1972, abandoned. This application Feb. 27, 1974, Ser. No. 446,275
Int. Cl. H01m 35/18
U.S. Cl. 136—175 8 Claims



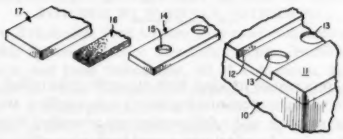
1. A method of sealing hermetically an aperture in a metallic surface which comprises providing a heat destructible, vapor leak-tight barrier across and closing the aperture, providing a welding metal shape contacting the barrier adjacent at least the perimeter of the aperture, abrading away at least a portion of the barrier whereby metallic and electrical contact is made between the welding metal shape and at least a portion of the perimeter of the aperture, and spot welding the metal shape thereby producing a hermetic seal in the aperture.

3,904,441

BATTERY VENT CONSTRUCTION

John P. Badger, Genoa, Ohio, assignor to Eltra Corporation, Toledo, Ohio

Filed Dec. 26, 1973, Ser. No. 431,139
Int. Cl. H01m 1/06
U.S. Cl. 136—177 3 Claims



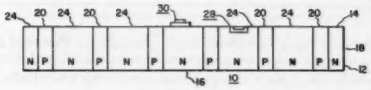
1. A venting system for a storage battery comprising, in combination, a generally planar battery cover having an elongate channel extending across said cover and recessed below the plane of said cover, a plurality of apertures extending through the floor of said channel for communication with the cells of said battery, an elongate flat strip of microporous material substantially coextensive with and extending over and sealed to the floor of said channel to cover said apertures, said microporous strip comprised of a material permeable to gas but substantially impermeable to liquid, and an elongate rigid guard extending over the outer face of said microporous strip and being substantially coextensive with said strip, said guard having spaced apart peripheral portions of its lower surface sealed to said strip such that gas passing outwardly through said apertures and filter strip may pass to atmosphere through passages between said spaced apart peripheral portions of said strip.

3,904,442

METHOD OF MAKING ISOLATION GRIDS IN BODIES OF SEMICONDUCTOR MATERIAL

Thomas R. Anthony, and Harvey E. Cline, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 30, 1973, Ser. No. 411,022
Int. Cl. H01l 7/34
U.S. Cl. 148—1.5 16 Claims



1. A method for making an isolation grid comprising a first group of planar regions, each of which are substantially parallel to each other and a second group of planar regions which are substantially parallel to each other and at a selected angle to at least one of the planar regions of the first group in a body of semiconductor material comprising the process steps of:

a. disposing a first array of metal wires on a selected surface of a body of semiconductor material having a selected resistivity, a selected conductivity and a preferred planar crystal structure orientation, the vertical axis of the body being substantially aligned with a first axis of the crystal structure which is substantially perpendicular to the selected surface of the body and the direction of the metal wires being oriented to substantially coincide with at least one of the other axes of the crystal structure;

b. heating the body and the array of metal wires to a temperature sufficient to form an array of liquid wires of metal-rich semiconductor material on the surface of the body;

c. establishing a temperature gradient substantially parallel to the vertical axis of the body and the first axis of the crystal structure;

d. migrating the first array of metal-rich liquid wires through the body substantially aligned with the first axis of the crystal structure to form a plurality of first planar regions of recrystallized material of the body;

e. disposing a second array of metal wires on the selected surface of the body of semiconductor material, each of the wires being substantially perpendicular to the plane of one of the migrated metal wires of the first array;

f. heating the body and the second array of metal wires to a temperature sufficient to form a second array of liquid wires of metal-rich material;

g. establishing a temperature gradient substantially parallel to the vertical axis of the body, and

h. migrating the second array of metal enriched semiconductor material wires through the body substantially aligned with the first axis of the crystal structure to form a plurality of second planar regions of recrystallized material of the body.

3,904,443

HIGH TEMPERATURE LUBRICANT

Douglas C. Sullivan, Kent; Edward C. Ross, Seattle, and Per O. Saelid, Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 2, 1973, Ser. No. 337,402
Int. Cl. C23c 1/10; C23f 7/08
U.S. Cl. 148—6.15 R 3 Claims

1. A lubricant-etchant composition consisting essentially of a liquid portion containing:

Component	Volume %
Phosphoric acid (86% H_3PO_4)	43 – 52
Water	30 – 40
Wetting agent	1 – 3
Organic solvent	10 – 22

combined with a film-forming dry powder portion containing:

Component	% by Weight
Molybdenum disulfide (MoS_4)	20 – 60
Yellow lead oxide ($PbO)_2$	20 – 60
Graphite	5 – 30

said portions being combined in proportions so that said powder portion is at least completely wetted by said liquid portion.

3. A lubricant-etchant composition consisting essentially of a liquid portion consisting essentially of:

Component	% by Volume
Water	34.0 ± 2
Wetting agent	2.0 ± 2
Phosphoric acid (86% H_3PO_4)	48.0 ± 2
Solvent	16.0 ± 2

combined with a dry material consisting essentially of:

Component	% by Weight
Molybdenum disulfide	40.0 ± 2
Yellow lead oxide	40.0 ± 2
Graphite	20.0 ± 2

said liquid portion being present in the range of ½ to 2 U.S. gallons for each 8 pounds of said dry material.

3,904,444

METHOD FOR HEAT TREATMENT FOR PROTECTED ELECTRIC ELEMENTS HAVING A MINERAL INSULATOR IN A RUST-PROOF COVERING

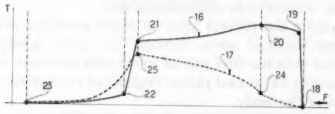
Yves Grange, Paris, France, assignor to Les Cables de Lyon, Lyon Cedex, France

Filed Apr. 23, 1974, Ser. No. 463,238

Claims priority, application France, Apr. 25, 1973, 73.14975

Int. Cl.[2] H01B *13/00*; **C21D** *9/60*

U.S. Cl. 148—11.5 R **4 Claims**



1. Heat treatment method for protected elements having at least one conductive core, a coating of an insulating mineral substance and an outside covering made of a rust-proof substance, the said elements undergoing several drawing operations, a suitable heat treatment being effected between two successive drawing operations, the said method comprising the steps of

a. annealing the covering,

b. annealing of the cores, and

c. tempering of the said covering and said cores.

3,904,445

STEEL BAR STOCK AND METHOD FOR MAKING SAME

Hugh M. Gallagher, Jr., 7262 State Rd., Cincinnati, Ohio 45230

Filed Dec. 29, 1972, Ser. No. 319,499

Int. Cl. C21d *7/02*

U.S. Cl. 148—12 B **6 Claims**

1. A method of making ferrous bar stock in sizes up to about 1½ inches diameter, comprising the steps of hot reducing to within 10% to 15% of final gauge in straight lengths, a killed ferrous alloy consisting essentially of carbon between about 0.50 – 0.55% by weight, manganese between about 1.20 – 1.65% by weight, vanadium between about 0.03 – 0.05% by weight, with the balance substantially all iron, cold finishing said hot reduced stock to final gauge, and stress relieving said stock at a temperature between about 500° F. – 850° F.

3,904,446

PROCESS OF MAKING HIGH STRENGTH COLD ROLLED STEEL HAVING EXCELLENT BAKE-HARDENING PROPERTIES

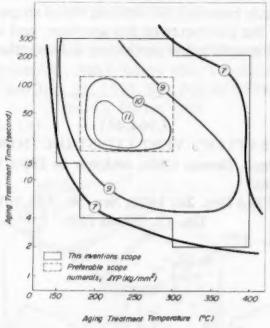
Kuniki Uchida; Kenzi Araki; Hirosi Narita; Shiro Fukunaka, and Takao Kurihara, all of Yokohama, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed July 11, 1974, Ser. No. 487,653

Claims priority, application Japan, July 12, 1973, 48-77865

Int. Cl. C21d *1/00*

U.S. Cl. 148—12.3 **5 Claims**



1. In a process of making high strength cold-rolled steel sheet comprising a steel-making stage, a hot-rolling stage, a cold-reducing stage and a full continuous annealing stage, an improved process for obtaining a steel having excellent accelerated aging properties characterized in that:

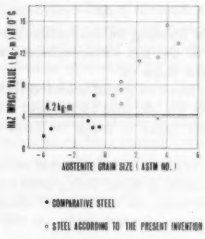
1. at the above steel making stage, C content and Mn content in steel are controlled within the ranges of 0.04 to 0.12 percent and 0.1 to 1.60 percent respectively,
2. at the above hot-rolling stage, a finishing temperature of more than 800°C and a coiling temperature of less than 700°C are maintained,
3. at the full continuous annealing stage,
   a. a travelling strip is heated up within the range of 700° to 900°C and is held at the above temperature for 10 to 120 seconds,
   b. said heated and held strip is rapidly cooled by a jet stream of water to room temperature,
   c. said rapidly cooled strip is reheated to the range of 150° to 400°C and held there for a period of time selected from the range of 2 to 300 seconds corresponding to the above reheating temperature, and
   d. cooling and coiling the strip obtained in (c).

3,904,447

METHOD FOR PRODUCING STEEL MATERIALS FOR LARGE HEAT-INPUT WELDING

Hisashi Gondo; Hajime Nakasugi; Hiroo Mazuda, all of Kisarazu; Yasayuki Kawada; Rikio Chijiiwa, both of Kimitsu, and Shoichi Matsuda, Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed July 24, 1974, Ser. No. 491,483
Claims priority, application Japan, July 31, 1973, 48-86230
Int. Cl.² C21D 7/14
U.S. Cl. 148—12.3 16 Claims



1. A method for producing steel materials suitable for large heat-input welding, which comprises heating a steel ingot or slab containing 0.03 to 0.18%, C, 0.1 to 1.0% Si, 0.5 to 1.8% Mn, not more than 0.1% total Al, 0.004 to 0.03% Ti, and 0.001 to 0.009% total N, with the balance being Fe and unavoidable impurities to a temperature between 1250° and 1400°C so as to dissolve not less than 0.004% of the TiN into solid solution and then reprecipitating the dissolved TiN into fine TiN.

3,904,448

METHOD FOR PREPARING MAGNETIC ALLOY POWDER BY SURFACE NITRIDING

Noboru Takahashi; Koji Chiba; Mutsuaki Nakamura; Sadao Ozaki; Hiromasa Isono; Tunehide Naruse; Toshikazu Mishihara, and Iwao Fukushima, all of Yokohama, Japan, assignors to Victor Company of Japan, Limited, Japan

Filed Jan. 3, 1974, Ser. No. 430,575
Claims priority, application Japan, Jan. 4, 1973, 48-2164; Aug. 10, 1973, 48-89823; Nov. 30, 1973, 48-135005
Int. Cl.² H01F 1/02; C22C 1/04
U.S. Cl. 148—105 10 Claims

1. A process for preparing a magnetic alloy powder essentially consisting of iron and at least one of cobalt and nickel, the process comprising the steps of:

a. heating a crystalline powder material comprising reducible salts of iron and said cobalt and/or nickel, said reducible salts being selected from the group consisting of oxalates and formates, in a reducing atmosphere at a temperature of about 300°C for a period of 2 to 6 hours to incompletely reduce said salts to the corresponding metals;

b. continuing heating the incompletely reduced powder material in a gas stream containing a nitrogen-containing compound gas at a temperature of 250° to 400°C for a period of 15 to 60 minutes to nitrify the surface region of said powder material

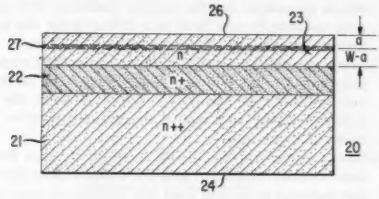
c. completing the reduction.

3,904,449

GROWTH TECHNIQUE FOR HIGH EFFICIENCY GALLIUM ARSENIDE IMPATT DIODES

James Vincent DiLorenzo, Piscataway, and Lars Christian Luther, Basking Ridge, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 9, 1974, Ser. No. 468,519
Int. Cl.² H01L 7/36
U.S. Cl. 148—175 5 Claims



1. A process for fabricating a high efficiency gallium arsenide Schottky barrier diode comprising:

a. depositing at least one layer of gallium arsenide on a first surface of a gallium arsenide substrate by vapor phase epitaxy from materials including a source of gallium, a source of arsenic, and a conductivity-type determining impurity, the materials being transported to the substrate by a carrier gas of hydrogen;

b. forming a thin film of gallium arsenide, ranging in thickness from 100 Angstroms to 700 Angstroms, which includes a relatively higher concentration of the impurity as compared with the deposited gallium arsenide layer by injecting substantially instantaneously into the carrier gas at constant pressure a constant volume of a gas containing a predetermined concentration of the impurity, the injection occurring during the deposition of the gallium arsenide layer;

c. forming an electrical contact on a second surface of the gallium arsenide substrate; and

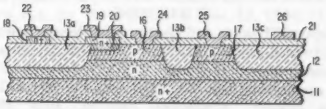
d. forming a rectifying barrier contact on the deposited gallium arsenide layer.

3,904,450

METHOD OF FABRICATING INJECTION LOGIC INTEGRATED CIRCUITS USING OXIDE ISOLATION

William Joshua Evans; Wesley Norman Grant, both of Berkeley Heights, and Bernard Thomas Murphy, New Providence, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 26, 1974, Ser. No. 464,480
Int. Cl.² H01L 21/76, 27/02, 21/22
U.S. Cl. 148—175 7 Claims



1. In a method for fabricating a semiconductor integrated injection logic cell structure having an injection transistor and a complementary switching transistor including the steps of forming on a semiconductor bulk portion of a first conductivity type a semiconductor epitaxial layer of the same conductivity type and having a lower concentration of first conductivity type impurities than the bulk portion and forming in the semiconductor a lateral and an inverted transistor,

the improvement being the steps of:

forming at least one region of oxide isolation extending partially through the thickness of the epitaxial layer and laterally surrounding and isolating portions of the eptiaxial layer so the epitaxial layer is suitable for use as an emitter for the switching transistor and the portion of the epitaxial layer in the remaining thickness is suitable for use as a lateral base for the injection transistor,

introducing impurities of a second conductivity type into the portions of the epitaxial layer laterally surrounded by the oxide isolation region to form one zone suitable for use as an emitter for the injector transistor and another zone suitable for use both as a collector for the injector transistor and a base for the switching transistor,

forming an interconnection pattern comprising regions of polycrystalline silicon containing impurities of the first conductivity type partially overlapping both the oxide isolation region and one of the isolated portion of the epitaxial layer, and

diffusing impurities of the first conductivity type from the interconnection pattern into the underlying semiconductive material to form at least one impurity pocket suitable for use as a collector for the switching transistor.

3,904,451
METHOD FOR PREPARING PRIMER FOR PERCUSSION-IGNITABLE FLASH LAMP

Nicholas J. Rainone, Clifton, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 28, 1973, Ser. No. 419,745
Int. Cl.[2] C06B *39/06*
U.S. Cl. 149—30 **6 Claims**

1. An efficient method of preparing a coating preparation containing fuel, oxidizer, metallic combustible and binder for use in single step coating of primer for percussion-ignitable flash lamps, which method provides a combination of efficiency and safety in handling during manufacture, said method comprising:

a. preparing a production quantity of an aqueous mixture containing at least 100 grams of dry ingredients, said dry ingredients being fuel, metallic combustible, and binder;
b. dividing said production quantity into fuel containing batches containing less than 40 grams of dry ingredients;
c. preparing an aqueous mixture comprising said oxidizer;
d. adding at least a portion of said aqueous mixture comprising said oxidizer to one of said fuel containing batches to form said coating preparation for use in single step coating of primer for percussion-ignitable flash lamps.

3,904,452
METHOD FOR THE STABILIZATION OF AQUEOUS SOLUTIONS OF NITROFORM AND STABILIZED SUCH SOLUTIONS

Kare Ragnvald Fossan, and Gustav Allan Wetterholm, both of Nora, Sweden, assignors to Nitro Nobel AB, Gyttorp, Sweden

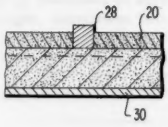
Continuation-in-part of Ser. No. 276,277, July 28, 1972. This application Aug. 24, 1973, Ser. No. 391,412
Claims priority, application Sweden, June 29, 1972, 8591/72
Int. Cl.[2] C06B *47/04*
U.S. Cl. 149—74 **12 Claims**

1. A stabilized aqueous solution of nitroform that contains (1) at most 6 % by weight of nitric acid and (2) a hydrolysis stabilizing agent, said hydrolysis stabilizing agent consisting essentially of the reaction product of nitroform with 0.1 to 1 % by weight of urea, said % by weight of urea being based upon the weight of the aqueous solution of nitroform.

3,904,453
FABRICATION OF SILICON SOLAR CELL WITH ANTI REFLECTION FILM

Akos George Revesz, Bethesda, and Robert John Dendall, Gaithersburg, both of Md., assignors to Communications Satellite Corporation (COMSAT), Washington, D.C.

Filed Aug. 22, 1973, Ser. No. 390,672
Int. Cl. B44d *1/16, 1/18;* C23f *1/00*
U.S. Cl. 156—3 **8 Claims**



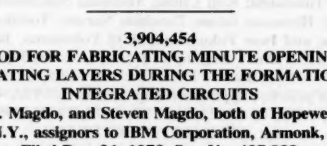
1. A method of forming an anti-reflective coating and metallic electrode on the top semiconductor surface of a solar cell comprising the steps of:

a. depositing a layer of metal selected from the group consisting of Nb, Ta, Zr, and Hf on said top surface,
b. oxidizing said layer of metal to form an anti-reflective layer,
c. depositing a layer of masking metal on said anti-reflective layer, said masking metal being selected from the group consisting of silver, aluminum and chromium,
d. forming a layer of photoresist on top of said masking metal,
e. forming a pattern of openings in said photoresist corresponding to the desired pattern of said metallic electrode,
f. etching said masking metal through the openings in said photoresist to form corresponding openings in said masking metal,
g. etching said anti-reflective layer through the openings in said photoresist and said masking metal to form corresponding openings in said anti-reflective coating,
h. depositing a layer of electrode metal for forming said electrode onto the surface of said photoresist and said semiconductor where the latter is exposed by said openings, at least a top surface of said electrode metal being selected from the group consisting of gold and rhodium,
i. removing said photoresist layer and the portion of said electrode metal layer overlying said photoresist layer, and
j. removing said masking metal by applying an etching solution to said device which will etch said masking metal but will not etch said electrode metal remaining in said opening.

3,904,454
METHOD FOR FABRICATING MINUTE OPENINGS IN INSULATING LAYERS DURING THE FORMATION OF INTEGRATED CIRCUITS

Ingrid E. Magdo, and Steven Magdo, both of Hopewell Junction, N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed Dec. 26, 1973, Ser. No. 427,888
Int. Cl.[2] H01L *21/283, 21/312, 21/316*
U.S. Cl. 156—11 **9 Claims**



8. In the fabrication of integrated circuits, a method comprising the steps of

forming a first layer of a first electrically insulative material over a semiconductor substrate,
forming a second layer of a second electrically insulative material on said first layer,
forming a third layer of said first insulative material on said second layer,
forming a first photoresist mask having a first slot on said third layer,
forming, by chemical etching through said first photoresist mask with an etchant which selectively etches said first insulative material, a second slot extending through said third layer in registration with said first slot,
forming, by chemical etching through said second slots with an etchant which selectively etches said second insulative material, a third slot extending through said second layer in registration with said second slot,
removing said first photoresist mask,
covering the third layer with a second photoresist mask having a fourth slot, a portion of which intersects and crosses only a portion of said second slot defined by the narrowest dimension of said fourth slot and thus forming an opening defined by said second slot and said fourth slot which has dimensions defined by the narrowest dimensions of said second and fourth slots, and
removing, by chemical etching through said second photoresist mask with an etchant which selectively etches said first material, a small opening extending through said first layer defined by the intersecting portion of said second and fourth slots.

3,904,455

LAMINATED FABRIC

Daniel S. Goldman, PO. c/o The Synthetics Group, Two Decker Sq., Bala Cynwyd, Pa. 19004

Filed Aug. 10, 1973, Ser. No. 387,287
Int. Cl.² D06M *17/00*
U.S. Cl. 156—62.4 **4 Claims**

1. The method of making a laminated fabric which comprises
advancing a band of low seam strength knitted or woven textile fabric with the back surface exposed, and
spin bonding filaments onto said back surface while the band is being advanced and forming thereon with said filaments a spun bonded non-woven lamina in adhered engagement with the back surface.

3,904,456

METHOD FOR INHIBITING TRANSMISSION OF AIRBORNE NOISE

Herwig Josef Schwartz, Schwetzingen, Germany, assignor to Teroson Werke, Heidelberg, Germany

Continuation-in-part of Ser. No. 321,609, Jan. 8, 1973, abandoned, which is a continuation of Ser. No. 11,942, Feb. 17, 1970, abandoned. This application Oct. 23, 1973, Ser. No. 408,311
Int. Cl.² E04B *1/99, 1/74*
U.S. Cl. 156—71 **7 Claims**

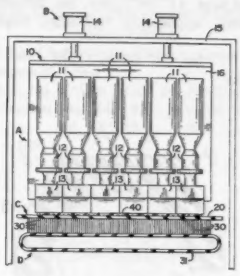
1. Method for inhibiting transmission of airborne noise which comprises interposing in the air space between the noise source and the location to be insulated a thin, dense, film composed essentially of about 10 to about 40 weight percent ethylene-vinyl acetate copolymer having an average vinyl acetate content of from about 10 to about 42 percent by weight and a glass transition temperature of at least about 30° Centigrade below the average ambient temperature in the said air space and from about 60 to about 90 percent by weight of inorganic filler materials effective to produce a film or sheet density greater than about 2 grams per cubic centimeter, said film further being able to be shaped into a three dimensional form which is retained in storage, shipment and in use as an inhibitor of transmission of said airborne noise in said air space.

3,904,457

METHOD OF ULTRASONIC BUTT SPLICING REINFORCED TIRE FABRIC

William Patrick Laughlin, Akron, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 222,595, June 7, 1972, abandoned. This application Sept. 12, 1974, Ser. No. 505,413
Int. Cl.² B29C *27/08;* **B23K** *1/06*
U.S. Cl. 156—73.4 **1 Claim**



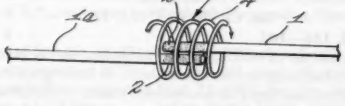
1. The method of butt splicing the edges of rubber compound coated tire type reinforcing fabric plies to one another in which the reinforcing cords of said fabric are parallel to each other and to said ply edges with the cords in each ply parallel to the cords in the other ply and in which said reinforcing fabric consists of inextensible cords selected from the group consisting of steel wire and glass cords, in which the rubber in said rubber compound is unvulcanized or not cross-linked and is selected from a group consisting of natural rubber and synthetic rubbers which comprises the steps of bringing said edges of said unvulcanized rubber compound into contiguous relationship, contacting said edges directly with an ultra-sonic generating means, applying pressure to said edges, distributing said pressure uniformly on said edges with a pressure optimizing means without substantially decreasing the ply thickness at the ply edge thereby trapping the rubber compound at said ply edges in a chamber defined by several parallel cords in each ply closest said ply edge, said ultra-sonic generating means and said pressure applying means and subjecting said edges to ultra-sonic vibrations by actuating said ultra-sonic generating means thereby heating the rubber compound at said ply edges which causes said rubber compound to flow and to homogenize to give a strong splice yet does not cause said rubber to cross-link or vulcanize.

3,904,458

METHOD OF JOINING CONTINUOUS STRANDS

Raymond Patrick Wray, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Continuation-in-part of Ser. No. 54,646, July 13, 1970, abandoned. This application Oct. 25, 1972, Ser. No. 300,874
Claims priority, application United Kingdom, July 16, 1969, 35772/69; Feb. 20, 1970, 8225/70; Mar. 12, 1970, 11930/70
Int. Cl.² D02G *3/22;* **B65H** *69/06*
U.S. Cl. 156—85 **12 Claims**



1. A method of forming a joint between the end portions of two continuous strands comprising the steps of: arranging the end portions in overlapping engagement, applying an adhesive

only to the end portions to bond the end portions together, wrapping a heat-shrinkable tie-yarn in spiral form around the bonded end portions and shrinking the wrapped tie-yarn around the bonded end portions.

3,904,459

METHOD OF RETREADING TIRES

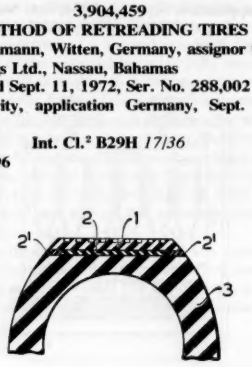
Wilhelm Schelkmann, Witten, Germany, assignor to Vakuum Vulk Holdings Ltd., Nassau, Bahamas

Filed Sept. 11, 1972, Ser. No. 288,002

Claims priority, application Germany, Sept. 11, 1971, 2145574

Int. Cl.[2] B29H *17/36*

U.S. Cl. 156—96 **14 Claims**



1. A method of retreading tires, comprising, in combination, the first step of positioning a tread strip in proximity to the outer periphery of a tire carcass; the second step of providing intermediate said carcass and said strip an unvulcanized adhesive bonding layer; the third step of effecting temporary adhesive bonding of said strip to said carcass by pressing said strip and said carcass together with a pressure sufficient to cause the material of said bonding layer to enter into and completely fill all the surface depressions in the facing surfaces of said strip and of said carcass and to completely fill the space intermediate the facing surfaces of said strip and of said carcass; and the fourth step of effecting permanent bonding of said tread strip to said carcass by effecting vulcanization of said bonding layer by heating and without any holding wrapper or holding form, including effecting vulcanization of the marginal portions of said layer in advance of vulcanization of the central portion of said layer by first heating to the vulcanization temperature said marginal portions and thereafter heating to said vulcanization temperature the central portion of said layer, so that the decrease in adhesive force of said central portion resulting during heating of the latter is delayed until after the vulcanization of said marginal portions has been substantially completed, whereby during the course of the vulcanization of the entire bonding layer the total adhesive force exerted by said layer will be sufficient to hold said tread strip in place on said carcass without the need for a holding wrapper or holding form.

3,904,460

TREATING GLASS SHEETS

John A. Comperatore, Natrona Heights, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 103,916, Jan. 4, 1971, abandoned, which is a continuation-in-part of Ser. No. 736,019, June 11, 1968, abandoned. This application Dec. 20, 1973, Ser. No. 426,758

Int. Cl.[2] B32B *17/10, 31/06*

U.S. Cl. 156—102 **8 Claims**

1. In the art of making a bent laminated safety glass windshield comprising an outer glass sheet, an inner glass sheet and an intermediate layer of transparent plastic material adhering to said glass sheets together wherein said glass sheets are first shaped to different curvatures desired for said outer and inner glass sheets respectively of said bent laminated windshield and then laminated to one another with said layer of plastic therebetween, the improvement comprising

a. disposing a single glass sheet while at an elevated temperature range sufficient to deform said glass sheet between a pair of press bending molds having complementary shaping surfaces capable of shaping a heat-softened glass sheet into approximately the curvature desired for said outer glass sheet of said bent laminated windshield,

b. engaging said single glass sheet between said pair of press bending molds throughout substantially its entire areal extent while said sheet is at said elevated temperature range to shape said sheet to its desired curvature throughout substantially its entire extent,

c. cooling said glass sheet,

d. disposing another single glass sheet while at said elevated temperature range between a pair of press bending molds having complementary shaping surfaces capable of shaping a heat-softened glass sheet into approximately the curvature desired for said inner glass sheet of said bent laminated windshield, the curvature desired for said inner glass sheet differing from that desired for said outer glass sheet by a factor dependent upon the thickness of said intermediate layer, the thickness of one of said glass sheets and the sharpness of the bend of said windshield,

e. engaging said another glass sheet between said press bending molds throughout substantially its entire areal extent while said glass sheet is at said elevated temperature range to shape said another sheet to its desired curvature throughout substantially its entire extent,

f. cooling said another glass sheet, at least one of said glass sheets being cooled at a rate sufficient to impart at least a partial temper thereto,

g. assembling said shaped glass sheets so that one of said glass sheets occupies the position of said outer glass sheet and the other of said glass sheets occupies the position of said inner glass sheet with a layer of plastic interlayer material therebetween to form an assembly, and

h. subjecting said assembly of said glass sheets and said layer of plastic interlayer material to an elevated temperature and elevated pressure for sufficient time to laminate said assembly into a unitary structure.

3,904,461

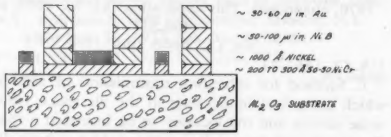
METHOD OF MANUFACTURING SOLDERABLE THIN FILM MICROCIRCUIT WITH STABILIZED RESISTIVE FILMS

Gordon J. Estep, Agoura, and Bernard Lee Burton, Simi, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

Continuation of Ser. No. 293,988, Oct. 2, 1972, abandoned. This application Sept. 19, 1974, Ser. No. 507,184

Int. Cl.[2] C23F *1/02*

U.S. Cl. 156—11 **4 Claims**



1. A method of making a microcircuit board comprising:

forming a substrate of high-temperature insulating material to the desired dimensions,

depositing a layer of nickel-chromium on said substrate,

forming a thin layer of nickel on said nickel-chromium layer,

depositing a nickel-boron film on said nickel layer,

heat-treating the board so formed,

photographically applying a desired pattern to said nickel-boron film with a photo-resist material,

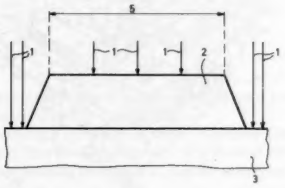
exposing said board to a first etching step to remove the unprotected nickel-boron and nickel layers,
removing said photo-resist material,
applying a second photo-resist pattern to said nickel-chromium layer,
and exposing said board to a second etching step to remove the unprotected nickel-chromium layer.

3,904,462

METHOD OF MANUFACTURING ETCHED STRUCTURES IN SUBSTRATES BY ION ETCHING

Heinz Dimigen, and Ursula Convertini, both of Hamburg, Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 27, 1973, Ser. No. 419,434
Claims priority, application Germany, Nov. 29, 1972, 2258297
Int. Cl.[2] C23C *15/00;* **H01L** *21/00*
U.S. Cl. 156—13 **7 Claims**



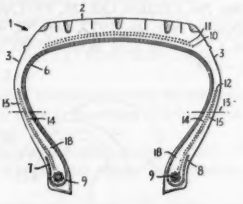
1. A method of manufacturing in substrates and by means of ion etching via an etching mask, an etched structure having an inclined edge profile, said method comprising the steps of providing on said substrate said etching mask that is characterized by a substantially homogeneous yield of particles removed therefrom in response to said ion etching regardless of the direction of incidence of said ion beam on said mask, adjusting at least one of the layer thickness of said etching mask and the angle of incidence of the ion beam so as to etch said substrate to a desired depth, and directing said ion beam onto said substrate and mask assembly.

3,904,463

RADIAL TIRE WITH ADDITIONAL SIDEWALL REINFORCEMENT

Jacques Boileau, Clermont-Ferrand, France, assignor to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie, Clermont-Ferrand, France

Division of Ser. No. 326,115, Jan. 23, 1973, Pat. No. 3,800,844. This application Nov. 14, 1973, Ser. No. 415,684
Int. Cl. B29h *17/14, 17/20, 17/22*
U.S. Cl. 156—123 **2 Claims**



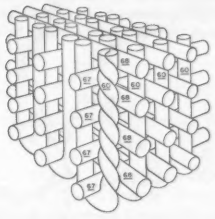
1. A method of manufacturing a radial-carcass tire, comprising the steps of laying bead wires and a carcass of cords on a cylindrical building drum, placing on the portions of the carcass intended to lie in the region of each sidewall of the tire extending from one of said bead wires to a point at least three-quarters of the way to the midpoint of the sidewall at least one ply of additional cords oriented perpendicularly to the cords of said carcass, said additional cords comprising a fragile core portion and a portion wound in a helix around the core and being capable of elongation by rupture of the core and increase of the pitch of the helix, and expanding the carcass to shape the tire, elongate the additional cords, break the core portions, and increase the pitch of the portions wound in a helix as a function of the elongation imposed.

3,904,464

PROCESS FOR MAKING THREE-DIMENSIONAL FABRIC MATERIAL

Robert W. King, Chelmsford, Mass., assignor to Avco Corporation, Cincinnati, Ohio

Division of Ser. No. 675,367, Oct. 16, 1967, abandoned. This application Jan. 24, 1972, Ser. No. 220,520
Int. Cl.[2] B31C *13/00*
U.S. Cl. 156—148 **2 Claims**



1. A method for fabricating a three-dimensional structure having a curved surface comprising:
a. orienting a first group of filaments to extend radially through the space corresponding to the shell of the curved surface, such filaments being sized and spaced to form a first set of rows, such filaments also being sized and spaced in said first set of rows to form a second set of rows which intersects the first set,
b. weaving into said first group of filaments along the first set of rows a second group of filaments,
c. weaving into said first group of filaments along the second set of rows a third group of filaments contiguous with the woven second group of filaments,
d. such filaments being sized and spaced relative to each other such that the filaments of each group are in close frictional contact with the filaments of each other group,
e. repetitively weaving such second and third group filaments into the first group in said manner to form the curved three-dimensional structure of the desired shape; and
f. compressing the contiguous X and Y axis filament along the Z axis into close meshing contact with each other and with the Z axis filaments, and impregnating said structure with cure-hardenable liquid matrix substance, and curing said impregnated structure to a hardened state.

3,904,465

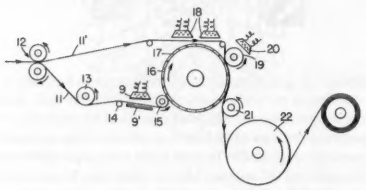
PROCESS AND APPARATUS FOR THE MANUFACTURE OF EMBOSSED FILM LAMINATIONS

Donald A. Haase, Penfield, and Robert E. Reed, Canandaigua, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 13,171, Feb. 20, 1970, abandoned, which is a continuation of Ser. No. 580,302, Sept. 19, 1966, abandoned. This application Sept. 21, 1972, Ser. No. 291,118
Int. Cl.[2] B32B *31/18, 31/20;* **B65D** *33/02, 37/00*
U.S. Cl. 156—199 **5 Claims**

1. A method for the production of a laminar thermoplastic film structure which comprises supplying a length of a first thermoplastic film onto an embossed, raised, patterned sur-

face of a cylindrical moving support, said raised, patterned surface being infrared absorbent, said patterned surface comprising a plurality of spaced-apart, continuous raised patterns circumscribing the periphery of said moving support, said raised pattern surface being interrupted by unpatterned circumferential bands, impressing said film against the surface of said moving support by nipping said film between said support and a counterrotating resilient surfaced roller to produce in said film a pattern corresponding to the embossed coated surface of said moving support, heating the raised portion of the embossed coated surface of said moving support supporting said film and maintaining the circumferential bands at a relatively cool temperature, supplying a second length of preheated thermoplastic film into superposed relationship with the first film supported by said moving support, said second film being impressed against said first film by the action of a roller rotating counter-current to and in nipping engagement with both the raised, patterned surface and the areas of said support intermediate said spaced-apart, raised, patterned surface portions to thereby heat-seal said preheated second film to the portions of said first film in contact with the raised portions of the embossed surface by applying pressure



to said second film in contact with said first film while said first film is supported by said support surface, and thereafter withdrawing the resulting laminar thermoplastic film from said support, a laminar characterized by longitudinal portions free of heat sealing corresponding to the areas of contact with the relatively cooled circumferential bands.

5. In a process for manufacture of bags of embossed thermoplastic film laminate by passing two layers of thermoplastic onto a roller having a raised pattern surface, applying heat to said raised pattern surface to thereby heat seal the layers together in a pattern corresponding to that of said raised pattern service, placing two of said laminates in contact with each other, slitting, edge sealing and end sealing to form bags therefrom;

the improvement which comprises passing said layers onto a roller having raised pattern surfaces interrupted by unpatterned circumferential bands, applying heat to said raised pattern surfaces,

cooling said circumferential bands,

whereby the laminate is characterized by longitudinal portions free of heat sealed patterns and performing said slitting and edge sealing in said longitudinal portions.

3,904,466
LABELLING MACHINES

William Leslie Jones, and Malcolm James Peter Banks, both of Bridgnorth, England, assignors to Decca Limited, London, England

Filed May 22, 1973, Ser. No. 362,674
Int. Cl.[2] B65C *1/06, 9/06, 9/14*
U.S. Cl. 156—216 **11 Claims**

1. A method of labelling slab-like objects, which have a narrow face and two opposite broad faces adjacent thereto, comprising the steps of:

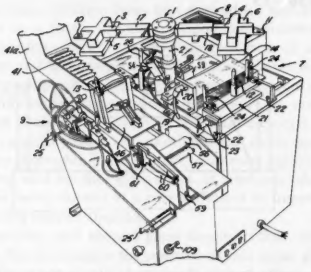
moving a first holder to a first operating station to pick up a label having inactivated adhesive on one side thereof from a stack by means of suction;

moving the first holder and the label which is held thereby to a second operating station;

activating the adhesive on the one side of the label while the first holder and label are at the second operating station; moving the first holder and activated label which is held thereby to a third operation station;

feeding a slab-like object to be labelled in a direction parallel to said opposite broad faces thereof into a second holder at the third operating station when the second holder is in a first position;

pivoting the second holder and the object to be labelled contained therein about a relatively fixed pivot point through a predetermined angle from said first position into a second position in which the said narrow face of the object to be labelled is adjacent the activated side of the label contained in the first holder when the first holder reaches the third operation station;



causing the label to adhere to the said narrow face of a slab-like object to be held by the second holder adjacent the label in the first holder at the third operating station by relative movement between the first and second holders;

returning the first holder to the first operating station to pick up another label; and,

pivoting the second holder and the slab-like object which is contained within the second holder and has the label attached to said narrow face thereof back to the first position so as to receive another object to be labelled as the labelled object is ejected from the second holder through a resilient gate which causes the ends of the label to adhere to the said two opposite broad faces of the object which are adjacent the said narrow face.

3,904,467
METHOD OF MAKING CURVED RESILIENT LAMINATES

Raymond C. Srail, Parma, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 192,038, Oct. 26, 1971, abandoned. This application Nov. 26, 1973, Ser. No. 418,903
Int. Cl.[2] B29D *7/24;* **B32B** *25/00, 27/00*
U.S. Cl. 156—229 **5 Claims**

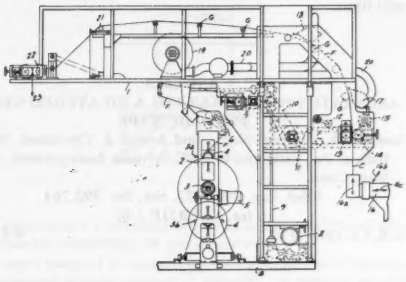
1. A process for making a curved resilient laminate which comprises vulcanizing a lamina of elastomer in adherent contact with a, lamina of heat formable elastomer, stretching the vulcanized laminate while hot, and cooling it while stretched.

3,904,468

METHOD OF MAKING A FLEXIBLE CLOSURE

Takashi Noguchi, Tokyo, Japan, assignor to Minigrip, Inc., Orangeburg, N.Y.

Division of Ser. No. 178,086, Sept. 7, 1971, Pat. No. 3,787,269. This application Aug. 30, 1973, Ser. No. 392,858
Int. Cl.² B32B 31/30
U.S. Cl. 156—244 4 Claims



1. A method of forming a sheet with a shaped profile strip means laminated thereon comprising:

means supplying a continuous sheet of plastic film,

training said film over the surface of a heated roller,

continuously heating the roller to a predetermined temperature,

extruding a heated continuous plastic strip having a precision shaped fastener profile on the outer surface,

moving the position of the extruder in a direction laterally of the direction of film movement so that the heated strip is applied to a precise location on the heated film while the film is on the roller with its inner surface contacting the film,

further moving the position of the extruder toward or away from the roller for adjusting the time of exposure to ambient air thereby controlling the temperature at which the extruded strip reaches the roller and is attached to the film,

transporting the film and attached extruded strip away from said roller,

and at a point substantially spaced from said roller blowing a jet of air selectively against the outer surface of said strip and limiting the jet of air to contact with the strip for accelerated cooling of the strip relative to the film.

3,904,469

METHOD OF MAKING A BONDED HELMET STRUCTURE

George Dickstein, Shaket Heights, Ohio, assignor to Sports Products Corporation, Cleveland, Ohio

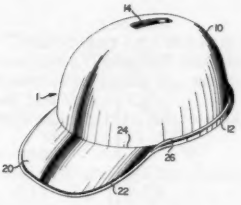
Continuation-in-part of Ser. No. 352,205, April 18, 1973. This application Nov. 30, 1973, Ser. No. 420,630
Int. Cl.² B29C 9/00, 24/00
U.S. Cl. 156—245 5 Claims

1. A method of manufacture for an enclosure of thermoplastic synthetic resin in the shape of a two-color billed helmet structure having

a molded ellipsoidal hollow crown portion, a front bill portion, and a horizontal planar base closure portion comprising

integrally molding the front bill portion and planar base closure portion corresponding in substantially elliptical shape to the crown portion in a uniformly colored one-piece molded bill part wherein the bill portion is attached at an inner edge thereof to the base closure portion; said bill portion having a first thickened edge extending around an outer peripheral edge of the bill portion and terminating at the inner edge of the bill at points where the outer edge of the bill portion is adjacent to the base closure portion; said base closure having integrally molded therewith an arcuate upwardly extending projection corresponding to the crown shape and spaced inwardly on the base closure from the inner bill edge and adapted to mate with an inner surface of the crown portion;

molding the hollow crown portion in a different uniform color with a lower second thickened edge extending along



a rear portion of the crown forward to a juncture with a corresponding first thickened edge on the bill portion, said second thickened edge outwardly offset from the crown and being recessed to register with the planar base closure portion;

assembling the helmet structure in an inverted position; and

applying ultrasonic energy to fuse the thermoplastic resin to join the crown portion to at least the planar base closure and arcuate projection.

3,904,470

METHOD FOR BONDING RUBBER TO PLASTICS

Takayuki Fukuki; Tamio Matsuura, and Noriyuki Takaoka, all of Ichihara, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

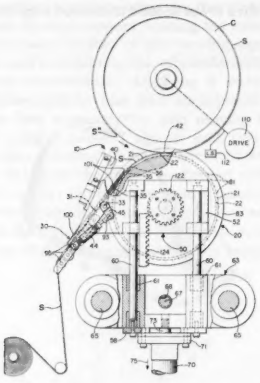
Filed May 2, 1973, Ser. No. 356,377
Int. Cl.² C09J 3/12, 3/14; B32B 25/08
U.S. Cl. 156—306 4 Claims

1. A method for bonding rubber to plastics by contacting a vulcanized shaped structure of an ethylene/propylene copolymer rubber or an ethylene/propylene/diolefin copolymer rubber with a polyolefin plastic at a temperature above the softening point of said polyolefin plastic, which comprises contacting [A] a vulcanized shaped structure of a composition consisting of a blend of (i) 60 to 97% by weight of a copolymer rubber component consisting of a copolymer rubber selected from the group consisting of an ethylene/propylene copolymer rubber having an ethylene content of 40 to 85 mol% and an ethylene/propylene/diolefin copolymer rubber having an ethylene content of 40 to 85 mol% and 0 to 100%, based on the weight of the copolymer rubber, of a rubber component other than the above copolymer rubbers and a butyl rubber, or 0 to 400%, based on the weight of the copolymer rubber, of a butyl rubber and (ii) 3 to 40% by weight of a crystalline polyolefin plastic component selected from the group consisting of a crystalline polyethylene plastic which may contain not more than 10 mol% of α-olefin units with three to 10 carbon atoms or vinyl acetate, and a crystalline polypropylene plastic which may contain not more than 10 mol% of ethylene units, with [B] a polyolefin plastic which may contain not more than 10 mol% of units of a comonomer, at a temperature above the softening point of the polyolefin plastic [B].

3,904,471
TIRE BUILDING APPARATUS

Donald C. Kubinski, Wadsworth, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Oct. 15, 1974, Ser. No. 514,348
Int. Cl.[2] B29H *17/20*
U.S. Cl. 156—405 2 Claims

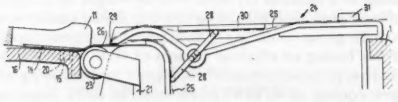


1. Tire building apparatus for applying narrow strip circumferentially about a tire building drum comprising a strip-applying wheel having a circumferential surface for transferring strip to a carcass on the drum, the wheel being rotatable about an axis parallel to the drum axis, a plurality of annular grooves opening to said surface, a strip control palm mounted to rock about an axis fixed parallel to the wheel axis, the palm having a strip conveying guide extending tangent to the transfer surface and having fingers extending respectively into said grooves, a knife fixed adjacent said wheel, extending transversely of the transfer surface and close to the terminals of said fingers, and means for rocking said palm to move said fingers out of the grooves to lift said strip from the transfer surface to severing relation with said knife.

3,904,472
APPARATUS FOR CUTTING AND SPLICING PHOTOGRAPHIC FILMS

Heinrich Glaus, Niederwangen, Switzerland, assignor to Styner & Bienz AG, Niederwangen, Switzerland

Filed June 19, 1973, Ser. No. 371,411
Claims priority, application Switzerland, July 20, 1972, 10884/72
Int. Cl.[2] B31F *5/02*
U.S. Cl. 156—443 10 Claims

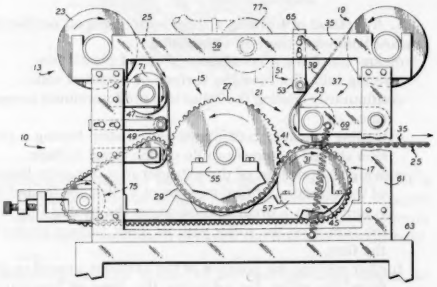


1. A film splicer comprising a base, a film carrier pivotally mounted on said base for movement between mounting and splicing stations, said carrier having guide means and pins for positioning film end portions in aligned and initially end overlapping relation, cutting means on said base at the cutting station and movable relative to said carrier for severing the overlapping ends of films mounted on said guide means to place the film ends in end-to-end abutting relation, support means on said base at the splicing station, a magazine on said base adjacent the splicing station for supporting a supply of individual self-adhesive splicing strips of a length greater than the width of the films, means on said base for feeding a single strip from said magazine onto said support means, said carrier cooperating with said support means to pivotally transpose said abutting film ends into engagement with one side portion of said strip at said splicing station, and means on said base responsive to further movement of said carrier for folding the other side portion of the strip over the edges of the films and pressing such portion into adherence with the other sides of said films.

3,904,473
APPARATUS FOR PRODUCING A BILAYERED GREEN CERAMIC TAPE

Leadom A. Warner, Sayre, and Joseph J. Cleveland, Wysox, both of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Aug. 29, 1973, Ser. No. 392,761
Int. Cl.[2] B31F *1/00*
U.S. Cl. 156—470 8 Claims



1. An apparatus for producing a bilayered green ceramic tape having a corrugated first layer and a substantially flat second layer bonded thereto, said apparatus comprising:

first supply means for supplying a substantially flat pliable first layer of green ceramic material to said apparatus;

forming means for forming said first layer whereby said first layer is provided with a corrugated cross section, said forming means comprising a ribbed rotatable cylinder and a ribbed belt member adapted for exerting pressure against said cylinder, said cylinder and belt member engaging said first layer and passing said first layer therbetween for a predetermined period of time whereby said first layer will engage a substantial portion of the outer ribbed portion of said rotatable cylinder;

solvent dispensing means adapted for applying an organic solvent to the surface of said substantially flat first layer which engages said ribbed belt member prior to said engagement;

drive means associated with said belt member of said forming means for providing relative movement thereto;

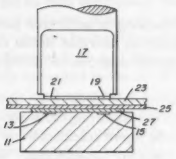
second supply means for supplying a substantially flat pliable second layer of green ceramic material to said apparatus; and

bonding means adapted for positioning and bonding a first surface of said flat second layer to a first side of said corrugated first layer.

3,904,474
APPARATUS FOR ULTRASONIC SPLICING

Walter C. Wasco; Charles W. Pierson, both of Rochester, and Leonard E. Pagnard, Hilton, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 126,091, March 19, 1971, Pat. No. 3,728,183. This application Oct. 16, 1972, Ser. No. 298,103
Int. Cl.[2] B01J *1/12*; B30B *12/00*
U.S. Cl. 156—581 6 Claims



1. Apparatus for ultrasonically uniting sheets of thermoplastic material comprising, in combination,

an anvil adapted to support such sheets, said anvil having a support surface having a plurality of spaced grooves therein, said grooves being arranged in a plurality of parallel lines spaced from one another, the grooves of each line being closely spaced and parallel to one another;

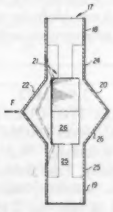
an ultrasonic horn adjacent said anvil in position to be traversed relatively across said anvil and across said grooves, said ultrasonic horn having a plurality of projecting bosses thereon corresponding to said lines; and

mechanism for effecting relative movement between said ultrasonic horn and said anvil in a direction across said anvil and across said grooves.

3,904,475
SPRING SPACER DEVICE FOR RESILIENTLY SUPPORTING NUCLEAR FUEL RODS

Junichiro Tashima, Yokohama, Japan, assignor to Tokyo Shibaura Electric Co., Ltd., Japan

Filed Jan. 17, 1973, Ser. No. 324,386
Claims priority, application Japan, Jan. 19, 1972, 47-8012
Int. Cl. G21c *3/30*
U.S. Cl. 176—78 6 Claims



1. A spring spacer device for resiliently supporting nuclear fuel rods comprising:

a latticed frame having a rectangular side frame and a plurality of cross-pieces mounted in said side frame to define a plurality of lattices through which nuclear fuel rods are adapted to respectively be inserted; and

a plurality of lantern type spring spacers supported on crossing points of said cross-pieces, each of said lantern type spring spacers including a pair of cylindrical end portions for supporting the lantern type spring spacers on said cross-pieces, and four leaf springs provided between said cylindrical end portions, such that said leaf springs are respectively positioned in corresponding lattices adjacent to each other, each of said leaf springs having flat end portions and a central outwardly bent portion projected against a nuclear fuel rod surface so as to be in contact therewith, said flat end portions of said leaf springs having means for imparting a smaller coefficient of elasticity to said flat end portions than that of said central outwardly bent portion, whereupon a force being applied to said outwardly bent central portion said flat end portions will flex radially inwardly.

3,904,476
TREATMENT OF CELLS OF A HYDROCARBON-CONSUMING MICROORGANISM

Richard I. Leavitt, Morrisville, Pa., assignor to Mobil Oil Corporation, New York, N.Y.

Filed May 29, 1973, Ser. No. 364,444
Int. Cl.[2] C12B *1/26*
U.S. Cl. 195—28 R 7 Claims

1. In a process for producing edible protein, which process comprises:

a. cultivating an aerobic, hydrocarbon-consuming microorganism in a fluid culture medium comprising an aqueous mineral salt nutrient and a liquid hydrocarbon nutrient and an oxygen-containing gas, whereby a portion of said liquid hydrocarbon is consumed and an aqueous suspension of cultivated cells with surface-associated contaminant comprising unconsumed liquid hydrocarbon is formed, and

b. subsequently recovering said surface-contaminated cells in a form and of such purity as to render them suitable for consumption, said recovery comprising a purification step,

the improvement in said recovery, whereby said surface-contaminated cultivated cells are rapidly purified, which comprises: killing said cells with an ozone-containing gas while in aqueous suspension; dissociating said liquid hydrocarbon contaminant and said cultivated cells into distinct entities; and, separating dead cultivated cells substantially free of hydrocarbon impurities.

3,904,477
PROCESS FOR PRODUCING 3′, 5′-CYCLIC ADENYLIC ACID WITH MICROORGANISM

Jiro Ishiyama, Noda, Japan, assignor to Kikkoman Shoyu Co., Ltd., Noda, Japan

Filed Feb. 21, 1974, Ser. No. 444,507
Claims priority, application Japan, Feb. 23, 1973, 48-21342
Int. Cl.[2] C12D *13/06*
U.S. Cl. 195—28 N 7 Claims

1. A process for producing 3′, 5′-cyclic adenylic acid which comprises culturing under aerobic conditions a strain of microorganism capable of producing 3′, 5′-cyclic adenylic acid without using a precursor thereof in the presence of 0.02 mg/l or more of a manganese ion in terms of $MnCl_2.4H_2O$, 10 mg/l or more of a ferric ion in terms of $FeCl_2.7H_2O$ and/or 10 mg/l or more of a ferrous ion in terms of $FeCl_3.7H_2O$, said microorganism comprising a member belonging to the genus Microbacterium, in a medium containing carbon and nitrogen sources, inorganic salts as nutrient sources and one or more of the above-mentioned metal ions in the same concentrations as mentioned above at pH of 5 to 10 and at a temperature of 20° to 40°C until 3′, 5′-cyclic adenylic acid is accumulated in the medium and recovering 3′, 5′-cyclic adenylic acid from the medium.

3,904,478

IMMOBILIZED CO-ENZYMES

Peter Duncan Goodearl Dean, 43 Redgate, Formby, Lancashire, and David Barry Craven, 18 Eversley Park, Storeton Rd., Oxton, Birkenhead, Cheshire, both of England

Filed Oct. 15, 1973, Ser. No. 406,663

Claims priority, application United Kingdom, Oct. 17, 1972, 47822/72

Int. Cl. C07g 7/02

U.S. Cl. 195—63 6 Claims

1. A process for the production of a reactive matrix comprising a co-enzyme or fragment of a co-enzyme having co-enzyme activity chemically attached to a water insoluble support material which comprises reacting a thio derivative of the co-enzyme or said fragment of a co-enzyme, in which an amino group on the co-enzyme or said fragment of a co-enzyme has been replaced by a thio group, with a bifunctional organic compound having a nucleophilic group so as to couple the bifunctional organic compound to the co-enzyme or said co-enzyme fragment and then coupling the resultant co-enzyme or said co-enzyme fragment reaction product to a water insoluble support material through the unreacted functional group of the bifunctional organic compound, said co-enzyme being selected from the group consisting of nicotinamide adenine dinucleotide (NAD), nicotinamide adenine dinucleotidephosphate (NADP), or their reduced forms, nicotinamide mononucleotide (NMN), adenosine diphosphate ribose (ADP-ribose) adenosine triphosphate (ATP), adenosine diphosphate (ADP), an adenosine monophosphate (AMP), pyridoxamine phosphate, a pterin, and a nucleoside phosphate, and said fragments of a co-enzyme being selected from the group consisting of a nucleoside containing a purine or pyrimidine ring or a phosphate-containing organic molecule, said thiol derivative being selected from the group consisting of a thiol, thioether, thioester, disulphide, sulphonyl halide, sulphonic acid, sulphonic ester, or alkyl sulphonyl or sulphone, said bifunctional organic compound being selected from the group consisting of aliphatic and aromatic diamines and aliphatic bifunctional amino acids, the aliphatic diamines having a chain of from 2 to 12 carbon atoms between the amino groups, the reaction of the bifunctional organic compound with the thio derivative of said co-enzyme or said co-enzyme fragment being carried out in aqueous or alcoholic solution at a temperature of from 70° to 90°C., said water insoluble support being a natural or synthetic organic polymeric support material comprising a plurality of vicinal diol groups reacted with cyanogen bromide and the co-enzyme or said co-enzyme fragment reaction product being coupled to the cyanogen bromide reacted support material through the unreacted functional group of the bifunctional organic compound.

3,904,479

PROCESS FOR PREPARING PANCREATIC ELASTASE

Masayuki Yoshizawa, Kawagoe; Kengo Araki, Niiza; Atsushi Koide, Funabashi, and Yoshitaka Matsuoka, Tokyo, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Oct. 9, 1973, Ser. No. 404,719

Claims priority, application Japan, Oct. 9, 1972, 47-100656

Int. Cl.² C07G 7/026

U.S. Cl. 195—66 R 6 Claims

1. A process for preparing pancreatic elastase which comprises the steps of salting out a liquid extract of mammalian pancreas, dissolving the resulting precipitates in an aqueous solution having a pH of 5 to 10, incubating the solution for a period of incubation within a range of about 15 to 100 hours at 5° to 15°C, about 5 to 30 hours at 15° to 30°C or about 1 to 10 hours at 30° to 40°C, and again salting out the solution.

3,904,480

ENHANCED PRODUCTION OF PLASMINOGEN ACTIVATOR

Robert N. Hull, Greenwood, Ind., and Rolf M. Huseby, Miami, Fla., assignors to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 300,054, Oct. 24, 1972, abandoned. This application July 3, 1974, Ser. No. 485,489

Int. Cl. C07g 7/026

U.S. Cl. 195—66 B 24 Claims

1. The method of producing plasminogen activator which comprises:

a. culturing plasminogen activator producing mammalian cells in an aqueous nutrient tissue culture medium containing assimilable sources of nitrogen, carbon and inorganic salts;

b. further culturing said cells in an aqueous nutrient tissue culture medium containing between 0.1 and 10 mcg/ml. of an antimitotic agent selected from the group consisting of podophylotoxin, colchicine, desacetylcolchicine, desacetamidocolchicine, N-desacetyl-N-methylcolchicine, 4-cyanocolchicine, vincristine, vinblastine, vinblastine N-methylamide and desacetylvinblastine amide until a substantial amount of plasminogen activator is present in said medium; and

c. recovering the plasminogen activator from said tissue culture medium.

3,904,481

DETERMINATION OF NITROGENASE

Thomas Alfred LaRue, and Wolfgang Gebhard Walter Kurz, both of Saskatoon, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Aug. 30, 1973, Ser. No. 393,007

Claims priority, application Canada, Sept. 15, 1972, 151822

Int. Cl.² C07G 7/02; C12K 1/00

U.S. Cl. 195—103.5 R 6 Claims

1. A process for determining nitrogenase activity comprising:

a. incubating a nitrogenase-containing material with an atmosphere containing acetylene until acetylene is reduced to ethylene to produce an atmosphere containing a mixture of acetylene and ethylene;

b. contacting at least a portion of said atmosphere mixture containing ethylene and acetylene with an oxidant comprising a periodate salt and a catalyst selected from the group consisting of a permanganate salt and osmium tetroxide to convert ethylene to formaldehyde without oxidizing acetylene significantly, and

c. determining the formaldehyde so produced to give a direct measure of nitrogenase activity.

3,904,482

METHOD FOR THE CULTIVATION OF MICROORGANISMS FROM BODY FLUID

Jack Judson Mehl, Landing, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Division of Ser. No. 342,086, March 16, 1973, and a continuation-in-part of Ser. No. 215,730, Jan. 6, 1972, abandoned. This application Feb. 11, 1974, Ser. No. 440,969

Int. Cl.² C12B 1/00, 1/24

U.S. Cl. 195—109 6 Claims

1. The method of culturing microorganisms obtained from a specimen of body fluid, which comprises:

a. providing an apparatus which comprises,

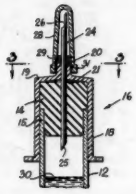
i. a container having at least one closed end and an open end;

ii. resilient closure means closing said open end;

iii. a nutrient medium partially filling said container and which is suitable for culturing microorganisms contained in said specimen;

iv. a gaseous atmosphere filling the space above said nutrient medium; and

v. a venting assembly mounted on the container and having means for maintaining fluid communication between the outside atmosphere and the atmosphere within the container, said venting assembly comprising a tubular member passing through said resilient closure to provide fluid communication between said gaseous atmosphere above the nutrient medium and the atmosphere outside of said container, said venting assembly including a flexible body portion having a closed end and an open end so that the closure means fitted in the open end of the container is capped thereby; the closed end of the body portion being formed with a hub having an axial bore therethrough and said tubular member is a cannula rigidly mounted in the axial bore between the ends of said bore and wherein a shield is mounted on the hub to enclose the portion of the cannula extending outwardly from the closed end of the body portion, the shield being formed with a plurality of ribs which are radially disposed around the inner surface thereof so



that the shield when mounted on the hub forms a plurality of passageways for the circulation of microbial gases from the interior of the container to the outside atmosphere and for diffusion of atmospheric oxygen from the outside to the inside of the container, said passageways being of such small cross section as to constitute a microbial barrier;

b. inoculating said culture medium disposed in said container with a specimen of body fluid to be cultured; and incubating said inoculated culture medium under environmental conditions of temperature, gaseous atmosphere and for a requisite period of time to facilitate maximum growth of any organisms present in said inoculated culture, whereby simultaneously any aerobic microorganisms will grow and multiple in the top portion of the medium and any anaerobic microorganisms will simultaneously grow and multiply in the bottom portion of the culture medium while any facultative and actively motile microorganisms will grow and multiply throughout the medium.

3,904,483

THERMAL CRACKING APPARATUS FOR HYDROCARBONACEOUS MATERIALS OF HIGH MOLECULAR WEIGHT

Yasuo Kurihara, and Masaki Kondo, both of Tokyo, Japan, assignors to Sumitomo Shipbuilding & Machinery Co., Ltd., Tokyo, Japan

Filed Mar. 21, 1974, Ser. No. 453,193

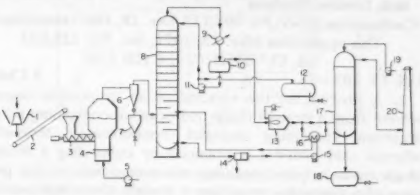
Claims priority, application Japan, Mar. 31, 1973, 48-36895

Int. Cl.² C10G 1/07, 7/00

U.S. Cl. 196—116 **3 Claims**

1. A thermal cracking apparatus for hydrocarbonaceous materials of high molecular weight, which comprises:

a fluidized-bed cracking furnace having a feed opening for said hydrocarbonaceous material and having an inlet for air so that said hydrocarbonaceous material can be thermally cracked in said furnace at about 450° to 550°C, said furnace having an outlet for the gas generated in said furnace; a cyclone having an inlet connected by a first conduit to said furnace outlet and adapted for removing solid particles from said gas, said cyclone having an outlet for purified gas; a rectification column having an inlet for said purified gas connected by a second conduit to said cyclone outlet, said column also having an outlet for high boiling materials at the bottom thereof, an outlet for rectified gas at the upper end thereof and an inlet for reflux at the upper end thereof; a condenser having an inlet connected by a third conduit to said outlet for rectified gas, said condenser having an outlet; a gas-liquid separator connected by a fourth conduit to said condenser outlet, said separator having an outlet for gas and an outlet for condensate; means connected between said condensate outlet of said separator and said reflux inlet of



said rectification column for feeding a portion of said condensate as reflux to said rectification column and means for removing the remainder of said condensate as a thermally-cracked oil product; a gas incinerator connected by a fifth conduit to said gas outlet of said separator and adapted for burning said gas from said separator, said incinerator having an outlet for the gaseous products of combustion thereof; a scrubber having a gas inlet connected by a sixth conduit to said incinerator outlet, means for feeding water into said scrubber to contact said gaseous products of combustion supplied from said incinerator and to remove acidic components therefrom, and means for discharging the remainder of said gaseous products of combustion from the scrubber.

3,904,484

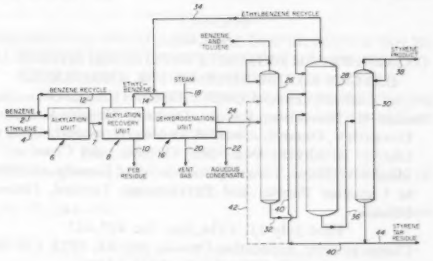
ETHYLBENZENE-STYRENE SEPARATION

Norman B. King, Wayland, Mass., assignor to The Badger Company, Inc., Cambridge, Mass.

Filed Sept. 7, 1972, Ser. No. 287,107

Int. Cl.² B01D 3/34

U.S. Cl. 203—52 **5 Claims**



1. In a process involving dehydrogenation of ethylbenzene in admixture with superheated steam in a dehydrogenation reactor to produce styrene monomer and by-product styrene tar residue, and fractionally distilling the dehydrogenation reaction effluent under subatmospheric pressure in a multi-stage distillation unit comprising a plurality of distillation stages to separately recover styrene monomer, lower boiling aromatics, primarily unreacted ethylbenzene and by-product styrene tar residue comprising styrene polymers, C_9^+ aromatic hydrocarbons and polymerization inhibitors, the improvement comprising recycling previously recovered styrene tar residue to said dehydrogenation reaction effluent at a point upstream of the separation of said styrene monomer

and ethylbenzene so as to maintain a liquid volume ratio in the range of from about 1 to 20 volumes of styrene tar residue to 20 to 1 volumes of the reaction effluent, and distilling the dehydrogenation reaction effluent in the presence of said recycled styrene tar residue.

3,904,485

PURIFICATION OF A MICRO-ORGANISM

Jean Amaudric du Chaffaut, Marseille; Jean Claude Hondermarck, and Bernard Maurice Laine, both of Lavera, all of France, assignors to The British Petroleum Company Limited, London, England

Continuation of Ser. No. 694,115, Dec. 28, 1967, abandoned. This application Mar. 18, 1971, Ser. No. 125,832

Int. Cl.[2] B01D *3/34;* **C12B** *1/00*

U.S. Cl. 203—56 **4 Claims**

1. A process for the removal of an evaporable organic solvent from a straight chain hydrocarbon-consuming micro-organism containing material contaminated therewith, wherein said material is obtained by cultivating a straight chain hydrocarbon-consuming micro-organism in the presence of a substrate comprising a straight chain hydrocarbon consumable by the micro-organism, recovering a product fraction comprising a hydrocarbon contaminated micro-organism, thereafter subjecting the hydrocarbon contaminated micro-organism in the presence of water to an extraction treatment with an organic solvent selected from the group consisting of ethanol, propanol, isopropanol, butanol, hexane and mixtures thereof whereby contaminant hydrocarbon is removed to give a material containing the micro-organism, water and solvent, said solvent having a boiling point such that it can be removed from said material while having at least some of said water in association with said micro-organism, said water being present in an amount greater than 20% by weight based on the dry weight of the micro-organism and said solvent being present in an amount which is not more than 50% by weight of said water, said process comprising of treating said material by the application of heat and/or reduced pressure at a temperature at which under the prevailing conditions solvent is removable by evaporation and below that which water is removed at a significant rate by evaporation whereby at all times at least 20% water based on the dry weight of the micro-organism is maintained in association with the micro-organism and while thus maintaining said material at said temperature to remove said solvent.

3,904,486

OXYGEN PROBE WITH SELF-CONTAINED SOURCE OF OXYGEN GAS, METHOD OF USE AND OXYGEN GENERATING COMPOSITION THEREFOR

Donald K. Faurschou, Kanata, Ontario; Harold A. Cohen, Downsview, Ontario; Albert H. Brooks, Agincourt, Ontario; Charles B. Alcock, Don Mills, Ontario, and Craufurd S. Monier-Williams, Toronto, Ontario, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed July 11, 1974, Ser. No. 487,443

Claims priority, application Canada, July 18, 1973, 176706

Int. Cl. G01n *27/46;* **C01b** *13/08*

U.S. Cl. 204—1 T **10 Claims**

1. In a probe tip sub-assembly for a probe for the direct determination of a dissolved gas in a molten metal of the type including:

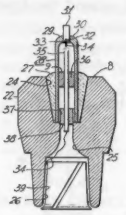
a. a heat-resistant, substantially electrically non-conductive cell tube;

b. a cell, comprising a preformed solid electrolyte compact which retains its ionic conduction properties and which does not exhibit substantial electronic conduction properties at the temperature of the molten metal, secured at one open end of said cell tube; and

c. at least one electrically conductive metallic element in intimate electrical contact with said cell, the improvement which comprises: a solid source of a reference oxygen gas generating agent disposed within tube (a), said solid oxygen gas generating agent comprising a Group II A metal peroxide, which decomposes as it passes through a temperature within the range of about 850°C – 925°C, thereby to generate substantially pure gaseous oxygen at a pressure of one atmosphere or more, said solid being adapted to generate substantially pure reference oxygen gas at the operating temperature of the probe while leaving a residue having substantially no vapor phase at said operating temperature; and a vent tube, one open end of which is adjacent said cell (b), the other open end of which projects beyond the end of the cell tube (a).

2. The improved sub-assembly of claim 1 wherein the solid oxygen gas generating agent is barium peroxide.

3. The improved sub-assembly of claim 2 wherein the barium peroxide is in the form of a preformed compressed pellet



derived from an intimate mixture of barium peroxide, aqueous sodium silicate solution and talc.

7. A method of providing a continuous supply of gaseous oxygen reference gas during the use of a probe for the direct determination of oxygen in molten steel involving the use of a solid electrolyte and a galvanic oxygen fuel cell principle, said method comprising: providing a preformed compressed mass of a Group II A metal peroxide, within a restricted zone including said solid electrolyte; decomposing said peroxide by the heat of the molten metal; and using the gaseous oxygen so-produced firstly to sweep stagnant gas from a zone at the base of the solid electrolyte, and secondly to bathe the solid electrolyte with said flowing, generated oxygen gas.

9. A composition for forming the sub-assembly of claim 3 comprising: the intimate admixture of barium peroxide, aqueous sodium silicate and talc, in the form of screened, dried particles of 40 – 425 microns in size.

3,904,487

ANODIC STRIPPING VOLAMMETRY AND APPARATUS THEREFOR

Stephen H. Lieberman, and Alberto Zirino, both of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 29, 1974, Ser. No. 518,539

Int. Cl.[2] G01N *27/42*

U.S. Cl. 204—1 T **19 Claims**

1. A method of measuring the presence and concentration of trace metals in a sample solution flowing through an active electrode and a reference electrode comprising:

depositing a film of mercury from a plating solution on the inner surface of said active electrode;

feeding a sample solution having said trace metals through said active electrode and said reference electrode;

applying a first potential across said active electrode and said reference electrode;

reducing said trace metals on the mercury film;

scanning a potential gradient across said active electrode with respect to said reference electrode;

stripping away various ones of said trace metals at discrete potential levels within the scanned potential gradient; and

monitoring the currents produced at the discrete poten-

tial levels to provide an indication of the presence and concentration of the trace metals.

10. An apparatus for measuring the presence and concentration of trace metals in a sample solution comprising:

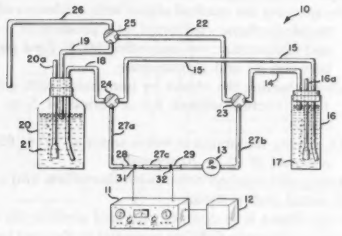
a source of a mercury plating solution;

means for sensing the presence and concentration of trace metals;

means connected to the sensing means for feeding said sample solution and said plating solution through the sensing means;

first means connected to a container of said sample solution and the plating solution source for alternately coupling each to said sensing means;

second means connected to the feeding means for alternately coupling said feeding means to the sample solution container and said plating solution source;



means connected to said sensing means for depositing a thin film of mercury therein when the first and second coupling means are actuated to connect said plating solution source to said sensing means and said feeding means to said plating solution respectively, and for reducing said trace metals on the mercury film when said first and second coupling means are actuated to connect said sample solution container to said sensing means and said feeding means to said sample solution container, respectively; and

means connected to said sensing means for indicating the presence and concentration of trace metals in said sample solution after the mercury film has been deposited and said trace metals have been reduced thereon, and as said sample solution continues to be fed through said sensing means.

3,904,488

TRUE REPLICATION OF SOFT SUBSTRATES

Richard William Nosker, Princeton, and Leonard P. Fox, Cherry Hill, both of N.J., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 245,659, April 19, 1972, abandoned. This application Oct. 23, 1973, Ser. No. 408,751

Int. Cl.[2] B01D *3/00, 3/34*

U.S. Cl. 204—5 **4 Claims**

1. A method of replicating a recording master having a developed resist coating thereon which comprises

a. vapor depositing a first layer of chromium from about 50–500 Angstroms thick on the resist,

b. vapor depositing a second layer of gold from about 100–2,000 Angstroms thick on the first layer, and

c. electrolytically depositing a third layer of bright nickel from about 0.3-2 mils thick on the second layer so as to form a stress-free replica.

3,904,489

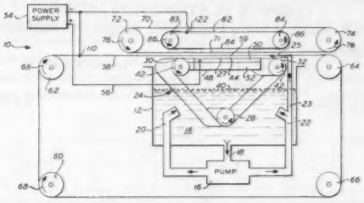
APPARATUS AND METHOD FOR CONTINUOUS SELECTIVE ELECTROPLATING

Frank J. Johnson, Santa Clara, Calif., assignor to Auric Corporation, Newark, N.J.

Filed July 13, 1973, Ser. No. 379,113

Int. Cl.[2] C07C *51/44*

U.S. Cl. 204—15 **28 Claims**



1. Apparatus for continuous electroplating of selected portions of discrete electronic components, while minimizing the plating of non-selected portions of said components, comprising:

an electroplating station;

a moveable plating belt adapted for carrying electroplating solution on the surface thereof;

means for continuously moving said belt through said electroplating station;

means for applying electroplating solution to said belt at a point in the progression thereof, upstream of said electroplating station;

belt means for conveying said discrete components as an array of mutually spaced elements across the surface of said moving plating belt, with substantially only the portions of said components selected to be plated in sliding contact with said electroplating solution on said belt; the direction of movement of said conveyed array being such in relationship to the movement of said belt that the trace of each said component on said belt continuously overlies fresh electroplating solution; and

means for applying a D.C. electrical potential between said component portions to be plated, and the backside of said plating belt, to enable said plating.

3,904,490

METHOD OF PROMOTING THE DISPERSION OF SOLID PARTICLES IN AN ELECTROLYTIC BATH FOR COMPOSITE ELECTROPLATING OF METALS

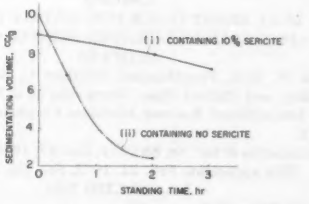
Ishimori Shigeru, Shizuoka Prefecture, and Otsuka Shinjiro, Hamamatsu, both of Japan, assignors to Suzuki Motor Company Limited, Shizuoka Prefecture, Japan

Filed Oct. 1, 1974, Ser. No. 511,096

Claims priority, application Japan, Oct. 5, 1973, 48-112110

Int. Cl. C23b *7/00, 5/08*

U.S. Cl. 204—16 **9 Claims**



1. In a method of plating metallic articles by composite electro-deposition thereon of first and second components, wherein said first component is nickel and said second component a powder insoluble in an electrolytic bath containing at

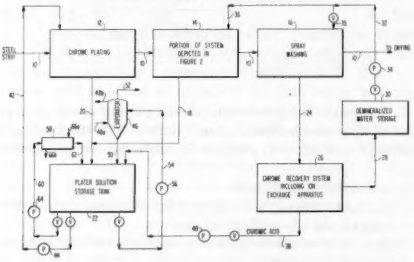
least a soluble compound of nickel, the improvement which comprises adding sericite to the electrolytic bath as a dispersant of said second component with respect to said first component.

3,904,491

CONTROLLING ELECTROLYTE CONCENTRATION IN ELECTROLYTIC AND RINSING TREATMENT OF CHROME PLATED STEEL STRIP

Robert B. Smith, Crown Point, Ind., assignor to National Steel Corporation, Pittsburgh, Pa.

Filed Oct. 12, 1973, Ser. No. 405,893
Int. Cl.² C25D 7/00
U.S. Cl. 204—28 **11 Claims**



1. In a method for treating chrome plated steel strip wetted with residual plating electroylte containing hexavalent chromium in the form of anions where moving strip is subjected to counterflow rinsing to remove hexavalent chromium from solution wetting the strip by passage through a succession of rinsing stages each containing a bath of rinse solution comprising an aqueous solution of hexavalent chromium in the form of anions, with water for said rinsing being introduced in the last of said stages the strip encounters and rinse solution moving from stage to stage in a direction opposite to strip movement, the improvement comprising

subjecting said moving strip in an intermediate rinsing stage both to rinsing to remove hexavalent chromium from soultion wetting the strip and to electrochemical treatment to apply a hexavalent chrome oxide coating to the strip with the rinse solution for this intermediate rinsing stage also forming the electrolyte for said electrochemical treatment and controlling the concentration of hexavalent chromium in said rinse solution forming said electrolyte by controlling the water introduction rate into said last stage in response to the speed of strip movement and also in response to conductivity of said rinse solution forming said electrolyte, said controlling of water introduction rate being accomplished by automatic mechanism having input signals varying with measured strip speed and electrolyte conductivity.

3,904,492

DUAL RESIST USAGE IN CONSTRUCTION OF APERTURED MULTILAYER PRINTED CIRCUIT ARTICLES

David W. Rich, Poughkeepsie; Matthew C. Smith, Pleasant Valley, and Michael Zipay, Stormville, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 885,771, Dec. 17, 1969, abandoned. This application Feb. 22, 1972, Ser. No. 228,288
Int. Cl.² C25D 5/00
U.S. Cl. 204—38 B **1 Claim**

1. In a process for depositing metal selectively upon a multilayer object having interlayer connecting perforations and a finely resolved metallization pattern of incised lines and lands on exterior surfaces the steps of:

providing temporary electrical circuit paths for connecting electrolytic plating voltages to the said metallized lands;

constructing a composite mask, secured to said object and outlining the perforations and lands for plating while sealably masking the said lines, by the following sequence of steps:

a. coating said object surface with a thin uniform layer of a first photo-resist material having liquid form;

b. image-wise photo-exposing, developing and hardening said first material into a soluble primary mask component;

c. applying to the surface of said primary mask a thick film layer of a solid unexposed photopolymerizable second resist material which forms a continuous bridging cover over the incised aspect of said object surface;

d. image-wise photo-exposing and developing but not hardening said second photo-resist layer into a soluble secondary mask component;

e. said step d) of developing the photo-exposed second layer comprising in immediate sequence:

e1. spraying the masked object with a solution of 1.1.1. trichloroethane - inhibited, at a pressure of 8–16 psi and temperature not exceeding 60° F, for a period of between 30 and 120 seconds;

e2. contacting the object by immersion with a bath of 1.1.1. trichloroethane for a period of 5 to 10 seconds;

e3. rinsing the object in warm water at 75° to 85° F for a period of 15 to 20 seconds;

contacting said masked object with electroless and electrolytic metal plating media;

while the object is in contact with said electrolytic plating medium connecting plating potential to the said lands via said temporary path; and

removing said mask and temporary circuit paths.

3,904,493

GOLD SULFITE BATHS CONTAINING ORGANOPHOSPHORUS COMPOUNDS

Salvatore Losi, Geneva, Switzerland; Pierre Lalanne, Gex, France; Rene Henzi, and Erwin Marka, both of Geneva, Switzerland, assignors to Oxy Metal Industries Corporation, Detroit, Mich.

Filed Aug. 8, 1973, Ser. No. 386,798
Claims priority, application Switzerland, Aug. 10, 1972, 11975/72; Aug. 6, 1973, 11388/73
Int. Cl.² C25D 3/48, 3/62
U.S. Cl. 204—43 G **6 Claims**

1. In an aqueous electroplating bath for the deposition of gold or a gold alloy from a sulfite complex, the improvement comprising including from 1 mg/l up to the solubility limit of the bath of an ester of an organophosphorus compound of the formula

$$(HO)_2OP—CR'R'' —PO(OH)_2$$

wherein R′ represents Cl, Br, I, or a free or esterified OH group; R″ represents H, halogens or C_1 to C_6 linear or

branched alkyl or alkenyl groups which may be substituted by a group selected from the group consisting of OH, CN, Cl, Br, I, COOH, SO_3H and PO_3H_2 which can be free, salified or esterified, and carbonyl groups; and wherein the acid functions are at least partially esterified with lower alcohols of 1 to 6 carbon atoms.

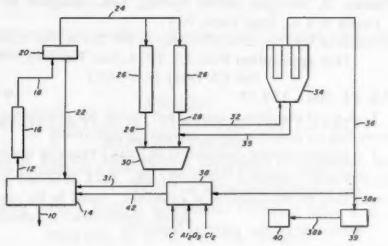
3,904,494
EFFLUENT GAS RECYCLING AND RECOVERY IN ELECTROLYTIC CELLS FOR PRODUCTION OF ALUMINUM FROM ALUMINUM CHLORIDE

Stanley C. Jacobs, and Ronald C. Schoener, both of Lower Burrell, Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 178,864, Sept. 9, 1971, abandoned. This application Nov. 27, 1973, Ser. No. 419,390

Int. Cl. C22d *3/12*; **B01d** *53/00*

U.S. Cl. 204—67 **11 Claims**



1. In a process for electrolysis of aluminum chloride dissolved in a molten metal halide electrolyte containing at least one halide from the group consisting of alkali metal halides and alkaline earth metal halides to produce aluminum at above 660°C, wherein effluent gas containing gaseous aluminum chloride and at least one gaseous halide of the said electrolyte is evolved, the steps comprising selectively condensing and separating from said effluent gas a mixture of aluminum chloride and at least one substance selected from the group consisting of alkali metal halides and alkaline earth metal halides, and subsequently condensing remaining aluminum chloride from the residual gaseous effluent.

3,904,495
ELECTROLYTIC-ELECTRODIALYTIC AND CHEMICAL MANUFACTURE OF CHLORINE DIOXIDE, CHLORINE AND CHLORIDE-FREE ALKALI METAL HYDROXIDE

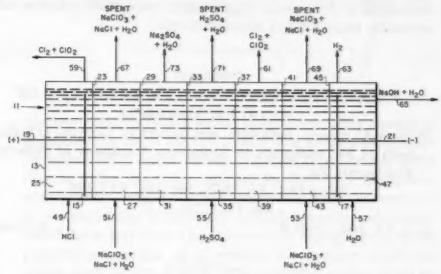
Jeffrey D. Eng, North Vancouver, and Cyril J. Harke, Burnaby, both of Canada, assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Jan. 2, 1974, Ser. No. 430,005

Int. Cl. C01b *17/96*; **C01d** *1/06*; **C01b** *7/06*

U.S. Cl. 204—93 **10 Claims**

1. An electrolytic-electrodialytic method for the manufacture of chlorine, chlorine dioxide, sulfuric acid-free alkali metal sulfate, alkali metal hydroxide substantially free of alkali metal halide, and hydrogen which comprises electrolyzing, electrodialyzing and chemically reacting in a cell having an anode compartment with an anode therein, a buffer compartment B^1, a sulfate compartment S, an acid compartment H, a chlorine dioxide generating compartment G, a buffer compartment B^2 and a cathode compartment with a cathode therein, there being from one to one hundred sets of compartments B^1, S, H and G intermediate the anode and the B^2 compartment, with the anode compartment being separated from B^1 by anion-active permselective membrane M^{a-1}, the B^1 and S compartments being separated by a cation-active permselective membrane M^{c-1}, the S And H compartments being separated by an anion-active permselective membrane M^{a-2}, the H and G compartments being separated by a cation-active permselective membrane M^{c-2}, the G and B^2 compartments being separated by an anion-active permselective membrane M^{a-3} and the B^2 and cathode compartments being separated by a cation-active permselective membrane M^{c-3}, aqueous solutions resulting from feeding hydrogen chloride to the anode compartment, alkali metal chlorate and chloride to B^1 and B^2, sulfuric acid to H and water to the cathode compartment so that with the passage of electric current through the cell chloride and chlorate anions diffuse selectively from B^1 to the anode compartment through M^{a-1}, alkali metal cations diffuse selectively from B^1 to S through M^{c-1}, sulfate anions diffuse selectively from H to S through M^{a-2}, hydrogoen ions diffuse selectively from H to G through M^{c-2}, chloride and



chlorate anions diffuse selectively from B^2 to G through M^{a-3}, alkali metal cations diffuse selectively from B^2 to the cathode compartment through M^{c-3}, chloride, chlorate and hydrogen ions react to produce chlorine dioxide and chlorine in the anode compartment and in G, and alkali metal cations and water react to produce hydrogen and aqueous substantially alkali metal chloride-free alkali metal hydroxide in the cathode compartment, and recovering chlorine and chlorine dioxide from the anode compartment and G, spent aqueous alkali metal chloride and chlorate from B^1 and B^2, substantially sulfuric acid-free aqueous alkali metal sulfate solution from S, substantially alkali metal sulfate-free spent aqueous sulfuric acid from H, and hydrogen and substantially alkali metal chloride-free alkali metal hydroxide solution from the cathode compartment.

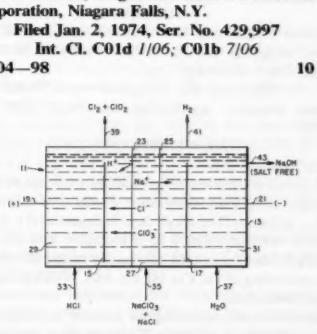
3,904,496
ELECTROLYTIC PRODUCTION OF CHLORINE DIOXIDE, CHLORINE, ALKALI METAL HYDROXIDE AND HYDROGEN

Cyril J. Harke, Burnaby, and Jeffrey D. Eng, North Vancouver, both of Canada, assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Jan. 2, 1974, Ser. No. 429,997

Int. Cl. C01d *1/06*; **C01b** *7/06*

U.S. Cl. 204—98 **10 Claims**



1. A method for electrolytically producing chlorine, chlorine dioxide, aqueous alkali metal hydroxide solution substan-

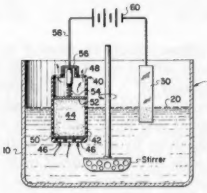
tially free of alkali metal chloride, and hydrogen, which comprises feeding hydrogen chloride to an anode compartment of an electrolytic cell, alkali metal chloride and alkali metal chlorate to a buffer compartment of said cell and water to a cathode compartment, the anode and buffer compartments being separated by an anion-active permselective membrane and the buffer and cathode compartments being separated by a cation-active permselective membrane, so that during electrolysis chlorate and chloride anions pass selectively from the buffer compartment to the anode compartment, where they react at the anode with hydrogen chloride to produce chlorine and chlorine dioxide, and alkali metal cations diffuse selectively from the buffer compartment to the cathode compartment, wherein they react with water at the cathode to produce hydrogen and aqueous alkali metal hydroxide solution substantially free of alkali metal chloride.

3,904,497

PROCESS FOR ELECTROLYTIC RECOVERY OF METALLIC GALLIUM

William C. Sleppy, Belleville, and Robert H. Goheen, O'Fallon, both of Ill., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 16, 1974, Ser. No. 515,250
Int. Cl. C25c *1/22*
U.S. Cl. 204—105 R **9 Claims**



1. A process for the recovery of gallium metal from gallium compounds which comprises:
   a. establishing the gallium compound as a dissolvable anode in an electrolytic cell;
   b. passing a current between the gallium compound anode and an inert cathode to effect anodic dissolution of the gallium compound; and
   c. simultaneously plating out metallic gallium on said cathode.

3,904,498

PROCESS FOR THE REMOVAL OF CATALYST RESIDUES

Karl-Dieter Hesse, and Karl-Ernst Koch, both of Marl, Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed July 10, 1972, Ser. No. 270,005
Claims priority, application Germany, July 14, 1971, 2135124
Int. Cl. B01j *1/00, 1/12*
U.S. Cl. 204—57.1 S **3 Claims**

1. A process for removing residues of a catalyst consisting essentially of (i) an aluminum compound of the formula AlR_nX_{3-n} wherein R is alkyl, X is halogen and n is a whole or fractional number from 0 to 3 inclusive and (ii) an organic solvent-soluble compound of a heavy metal selected from the group consisting of Fe, Co, Ni, Cr, Mo, W, Ti, Zr and V, which process comprises:
   a. ultrasonically admixing an organic solution of reaction products from a Ziegler-Natta solution polymerization of an olefin containing said residues at a temperature of 20°–70° C. with a two-component aqueous solution consisting essentially of (i) NaOH or KOH in a hydroxide concentration of about 100–600 mg./ml. in a total amount sufficient to ensure rapid flocculation of said catalyst residues and (ii) H_2O_2 in an amount sufficient to oxidize said compound of a heavy metal, said components being in an amount of water less than the quantity thereof which is dissolved in the organic solvent and absorbed by the thus-precipitated catalyst resides under operating conditions of the process such that no second liquid phase is formed in the resultant mixture, which mixture consists essentially of a single liquid phase, non-aqueous suspension of directly separable precipitated catalyst residues as hydroxides and salts; and
   b. separating said precipitated catalyst resides in the solid phase directly from the resultant mixture.

3,904,499

SOLID CURABLE COMPOSITIONS CONTAINING LIQUID POLYENES AND SOLID STYRENE-ALLYL ALCOHOL COPOLYMER BASED POLYTHIOLS

Charles R. Morgan, Silver Spring, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 250,553, May 5, 1972, Pat. No. 3,843,572. This application Feb. 25, 1974, Ser. No. 445,750
Int. Cl. B01j *1/10, 1/12*
U.S. Cl. 204—159.15 **9 Claims**

1. A solid curable composition useful for obtaining a solid cross-linked polythioether consisting essentially of:
   1. a liquid polyene containing at least 2 reactive unsaturated carbon to carbon bonds and having a molecular weight in the range of about 50 to 20,000;
   2. a solid polythiol containing at least 2 thiol groups per molecule of the general formula:

$$E\text{—}\left(\text{—O—}\overset{\overset{O}{\|}}{C}\text{—}R_3\text{—SH}\right)_x$$

wherein x is an integer of at least 2; E is a styrene-allyl alcohol copolymeric moiety remaining after removal of x hydroxyl groups from a styrene-allyl alcohol copolymer to form x ester linkages; said styrene-allyl alcohol copolymer reactant having a hydroxy group content from about 1.8 to 10 percent by weight and a styrene content from about 30 to 94 percent by weight; and R_3 is a polyvalent organic radical member free of reactive carbon-to-carbon unsaturation and is selected from the group consisting of aryl, substituted aryl, aralkyl, substituted aralkyl, cycloalkyl, substituted cycloalkyl, alkyl and substituted alkyl group containing 1 to 16 carbon atoms and mixtures thereof; the total combined functionality of (1) the reactive unsaturated carbon to carbon bonds per molecule in the polyene and (2) the thiol groups per molecule in the polythiol being greater than 4, and (3) a photocuring rate accelerator.

3,904,500

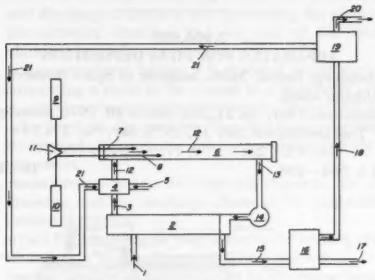
HYDROGEN ISOTOPE SEPARATION FROM WATER

Reed J. Jensen, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Dec. 17, 1973, Ser. No. 423,367
Int. Cl.[2] B01J *1/10*
U.S. Cl. 204—162 R **5 Claims**

1. A method of removing tritium from tritium-containing water which comprises: (a) forming a vapor of said water, (b) mixing said vapor with ethylene, (c) irradiating said mixture with a first laser light of a frequency which selectively excites those water molecules containing tritium but not tritium free molecules, (d) simultaneously irradiating said mixture with a second laser light of a frequency sufficient to photodissociate water molecules selectively excited by said first laser light but not sufficient to photodissociate those water molecules not selectively excited by said first laser light, said first and second laser lights having frequencies that are not substantially ab-

sorbed by ethylene, and (e) separating undissociated water from the reaction products produced by the reaction of the



photodissociation products of said excited water molecules with said ethylene.

3,904,501

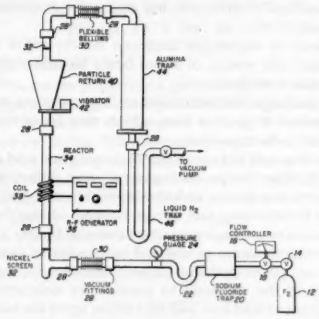
FLUORINE PLASMA SYNTHESIS FOR CARBON MONOFLUORIDES

Richard J. Lagow, Manchester; Raymond F. Baddour, Belmont; David K. Lam, and Lawrence A. Shimp, both of Cambridge, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 4, 1973, Ser. No. 403,362

Int. Cl.[2] B01K *1/00;* **C01B** *31/30, 9/08*

U.S. Cl. 204—164 **12 Claims**



1. A process for preparing carbon monofluoride comprising contacting a source of carbon with fluorine plasma.

3,904,502

METHOD OF FABRICATING A COLOR DISPLAY SCREEN EMPLOYING A PLURALITY OF LAYERS OF PHOSPHORS

Donald M. Phillips, Cayuta, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 5, 1973, Ser. No. 337,966

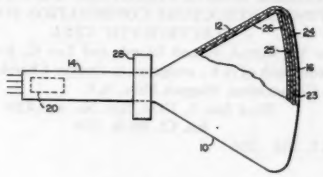
Int. Cl.[2] C25D *13/04, 13/12*

U.S. Cl. 204—181 **8 Claims**

1. A method of producing a multi-layer color cathodoluminescent display screen which produces light of varying color in response to electron excitation of varying energy, wherein individual distinct thin layers of finely divided cathodoluminescent phosphor materials of diverse color output are disposed upon an insulating light transmissive substrate with the individual layers being in intimate contact with the adjacent layer, which method comprises:

a. depositing a thin conductive film on the insulating light transmissive substrate;

b. electrophoretically depositing a front phosphor layer upon the thin conductive film which is maintained at a predetermined electrical potential, which front phosphor emits visible radiation of a predetermined color when electron excited, and which front phosphor layer substantially passes the emission from the other phosphor;



c. electrophoretically depositing at least one other phosphor layer directly upon the front phosphor layer, which other phosphor layer emits visible radiation of a distinct color diverse from the color emitted by the front phosphor, with the other phosphor layer thickness being determined to substantially completely absorb exciting electrons which have less than a predetermined energy level, while permitting passage of a portion of exciting electrons which have greater than a predetermined energy level to permit excitation of the front phosphor layer.

3,904,503

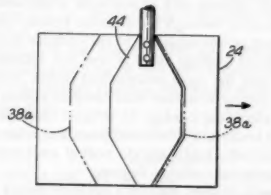
DEPOSITING MATERIAL ON A SUBSTRATE USING A SHIELD

Alexander Maxim Hanfmann, Allentown, Pa., assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed May 31, 1974, Ser. No. 475,007

Int. Cl.[2] C23C *15/00, 13/02*

U.S. Cl. 204—192 **10 Claims**



1. An improved method for depositing material on a substrate wherein a cathode acts as a source of material, and wherein a layer of material is deposited on the substrate by ion bombardment of the cathode in a chamber, wherein the improvement comprises:

inserting a shield between the cathode and the substrate to selectively shade portions of the substrate from the material being deposited thereon, the configuration of the shield being determined by the variations in the deposit thickness which would occur in the absence of said shield; and

withdrawing the shield after a predetermined interval, to increase the uniformity of the layer of material deposited on the substrate.

7. An improved apparatus for depositing material on a moving substrate, wherein a cathode acts as a source of material, and wherein a layer of the material is deposited on the substrate by ion bombardment of the cathode in a chamber, wherein the improvement comprises:

a shield in the chamber for shading selected portions of the substrate, the configuration of the shield being deter-

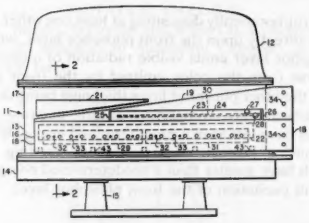
mined by the variations in the deposit thickness which would occur in the absence of said shield; and

means for positioning the shield between the cathode and the substrate during selected intervals of bombardment, to increase the uniformity of the layer of the material deposited on the substrate.

3,904,504
CATHODE BUSBAR STRUCTURE AND CATHODE FINGER STRUCTURE COMBINATION FOR AN ELECTROLYTIC CELL

Walter W. Ruthel, Grand Island, and Leo G. Evans, Tonawanda, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Jan. 3, 1974, Ser. No. 430,429
Int. Cl. B01k *3/04*
U.S. Cl. 204—286 **6 Claims**



1. A combination comprising a cathode busbar structure and cathode fingers having a cathode finger structure, said combination suitable for use with an electrolytic cell wherein:

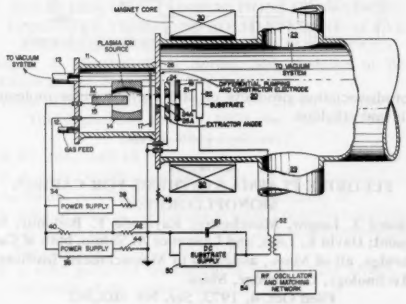
I. Said cathode busbar structure comprises at least one lead-in busbar and a plurality of busbar strips which have different relative dimensions, said lead-in busbar and said plurality of busbar strips are fabricated from a highly conductive metal and are positioned in such a configuration wherein the lead-in busbar and the plurality of busbar strips are adapted to carry an electric current and to maintain a substantially uniform current density through the cathode busbar structure to electrical contact points adjacent to the cathode fingers without any significant voltage drop across the cathode busbar structure and with the most economical power consumption in the cathode busbar structure, said cathode busbar structure is attached in electrical contact to at least one sidewall of a cathode walled enclosure fabricated from a conductive metal and having sidewalls, said cathode walled enclosure therein contains a plurality of cathode fingers;

II. Said cathode fingers having a cathode finger structure which comprises a corrugated conductive metal cathode finger reinforcing means having protrusions on the outer surface of its protruding ridges, lengths of highly conductive metal positioned in the cathode finger structure, and a foraminous conductive metal means attached to the outer surface of the protruding ridges of said cathode finger reinforcing means thereby forming the exterior of the cathode finger structure and providing a gas compartment space inside the cathode finger structure, said lengths of highly conductive metal are positioned in the cathode finger structure in such a configuration wherein the lengths of highly conductive metal are adapted to carry an electric current and to maintain a substantially uniform current density through the cathode fingers without any significant voltage drop across the cathode fingers and with the most economical power consumption in the cathode fingers, said cathode finger structure provides a structure for the cathode fingers, said cathode walled enclosure contains a plurality of cathode fingers which extend substantially across the interior of the cathode walled enclosure and the cathode fingers are attached in electrical contact to at least one interior sidewall of the cathode walled enclosure, said cathode busbar structure is attached in electrical contact to the exterior sidewall of the cathode walled enclosure on the sidewall adjacent to the attached cathode fingers.

3,904,505
APPARATUS FOR FILM DEPOSITION

Sol Aisenberg, Natick, Mass., assignor to Space Sciences, Inc., Waltham, Mass.

Continuation of Ser. No. 21,282, March 20, 1970, abandoned. This application July 12, 1972, Ser. No. 271,014
Int. Cl. C23c *15/00, 11/00;* **B23k** *15/00*
U.S. Cl. 204—298 **18 Claims**



1. A film deposition apparatus for depositing a film on a substrate comprising:

a. a deposition chamber having means for containing the substrate;

b. a source of deposition atoms to be deposited on the substrate, said source of atoms being located within said deposition chamber;

c. glow discharge ion source means for producing an energetic beam of gaseous ions, which may be of the same material to be deposited;

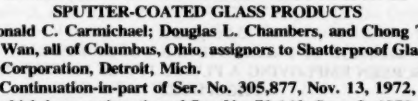
d. means disposed between said ion source and said deposition chamber for producing a pressure differential between the ion source and the deposition chamber; and,

e. means for directing said energetic beam of ions from the ion source to impinge upon the substrate, further wherein said energetic beam of ions and said source of deposition atoms are positioned with respect to each other and with respect to the substrate to provide for concurrent impingement of said ions and said atoms upon the substrate.

3,904,506
APPARATUS FOR CONTINUOUS PRODUCTION OF SPUTTER-COATED GLASS PRODUCTS

Donald C. Carmichael; Douglas L. Chambers, and Chong T. Wan, all of Columbus, Ohio, assignors to Shatterproof Glass Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 305,877, Nov. 13, 1972, which is a continuation of Ser. No. 70,143, Sept. 8, 1970, abandoned. This application Sept. 25, 1973, Ser. No. 400,561
Int. Cl.[2] C23C *15/00*
U.S. Cl. 204—298 **14 Claims**



1. Apparatus for continuous production of sputter-coated glass sheets and the like, which comprises:

a. a plurality of aligned independently controlled chambers having communication with one another and including an entrance chamber, a coating chamber and a discharge chamber,
b. means for sealing the coating chamber from the entrance and discharge chambers and for sealing the entry end of the entrance chamber and exit end of the discharge chamber from the atmosphere,
c. a support-platen having a horizontal upper surface for supporting a sheet to be coated in a horizontal position,
d. conveyor means for supporting the platen and sheet in a horizontally disposed position and for conveying them successively through the entrance, coating and discharge chambers,
e. means connected to the entrance chamber, the coating chamber and the discharge chamber for controlling the pressures therein,
f. means for admitting an inert gas into the coating chamber to maintain an inert gas atmosphere therein,
g. sputter-coating means mounted in the upper portion of the coating chamber for depositing a continuous film of a selected coating material on the upper surface of the sheet as it moves through the coating chamber, and
h. means actuated in response to movement of the platen for selectively opening and then closing in timed relation the means for sealing the coating chamber from the entrance and discharge chambers and the means for sealing the entry end of the entrance chamber and the exit end of the discharge chamber.

3,904,507

PROCESS COMPRISING SOLVENT EXTRACTION OF A BLENDED OIL

Ivor W. Mills, Media, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Division of Ser. No. 280,919, Aug. 15, 1972. This application Jan. 31, 1974, Ser. No. 438,512
Int. Cl. C10g *21/00*
U.S. Cl. 208—14 **19 Claims**

1. Process for preparing a petroleum oil of improved stability from a hydrogenated petroleum oil having a viscosity-gravity constant in the range of 0.78–0.94 and an ultraviolet absorptivity in the 335 millimicron region less than 0.04, said process comprising blending from 25–98 parts by weight of said hydrogenated petroleum oil with from 75–2 parts of an unhydrogenated, unhydrorefined petroleum oil having a viscosity gravity constant in the range of 0.78–0.99 and from 0.1–30 weight percent of a catalytically cracked cycle oil and then extracting said blend with an aromatic selective solvent to obtain a raffinate product.

3,904,508

PRODUCTION OF GASOLINE

Thaddeus E. Whyte, Jr., Cherry Hill, N.J., and John J. Wise, Media, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 22, 1974, Ser. No. 472,408
Int. Cl.[2] C10L *1/04*
U.S. Cl. 208—17 **3 Claims**

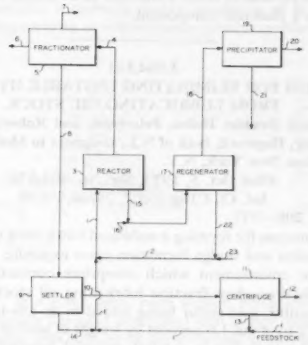
1. A gasoline composition having a clear research octane number of 89 to 99 comprising a mixture of 15 to 30 volume % natural gas liquids having a clear research octane of about 50 to 65 and 70 to 85 volume % of a synthetic substantially hydrocarbon gasoline consisting of at least about 50% aromatics having a clear research octane of up to about 112, and a 90% point of up to about 330°F derived from the conversion of at least one lower aliphatic organic compound having up to about 8 carbon atoms in a longest aliphatic hydrocarbon group and at least one hetero atom selected from the group consisting of sulfur, oxygen, nitrogen and halogen attached thereto in contact with an aluminosilicate zeolite having a silica to alumina ratio at least about 12.

3,904,509

RECOVERY OF LOW ASH CONTENT OIL FROM KETTLE RESIDUE FRACTION OF CATALYTICALLY CONVERTED HYDROCARBON OIL

William R. Anthoney, Concord, Calif., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 4, 1974, Ser. No. 503,092
Int. Cl. C10g *11/02;* **B01j** *9/20*
U.S. Cl. 208—113 **3 Claims**



1. A method for producing catalytically converted oil of low ash content, said method comprising:
1. subjecting catalytically converted oil from a catalytic conversion reaction of hydrocarbon oil to fractionation thereby producing a residue oil fraction containing catalyst entrained from the reaction,
2. allowing the catalyst in said residue oil fraction to settle thereby producing a major portion of said residue oil fraction from which the majority of catalyst has settled and a minor portion of said residue oil fraction containing settled catalyst,
3. centrifuging the major portion of said residue oil fraction to produce (a) an oil of low ash content and (b) and oily catalyst residue,
4. recycling to the reaction said oily catalyst residue,
5. recovering said oil of low ash content, and
6. recycling to the reaction the minor portion of said heavy oil fraction.

3,904,510

CATALYST REGENERATION PROCEDURE

John H. Sinfelt, Berkeley Heights, and James L. Carter, Chatham, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 388,746, Aug. 16, 1973. This application Oct. 31, 1973, Ser. No. 411,192
Int. Cl. C10g *35/08;* **B01j** *11/18*
U.S. Cl. 208—140 **15 Claims**

5. In a process for the catalytic conversion of a naphtha feed stock wherein a naphtha feed stock and hydrogen are contacted with a catalyst comprising from about 0.01 to about 3.0 wt. % of an iridium component and a chlorine component contained on a refractory inorganic oxide support at reforming conditions, the catalyst having been at least partially deactivated during contact with said naphtha feed stock by the deposition of carbonaceous residues, a method for regenerating said catalyst comprising (1) contacting said catalyst, after contact with said naphtha feed stock with an oxygen-free chlorine-containing reagent in a gaseous medium from the group consisting of hydrocarbon feed, hydrogen containing gas, inert gas and mixtures thereof in amounts sufficient to increase catalyst chlorine content to about 1.0 to about 4.0 wt. %, based on anhydrous catalyst, and (2) contacting said

treated catalyst with a substantially sulfur-free gaseous mixture containing oxygen, a chlorine-containing reagent, and water at a temperature of less than about 850°F. for a time sufficient to burn at least a substantial portion of said carbonaceous residues from said catalyst, said gaseous mixture containing 0.1 to 1.0 mole percent oxygen and a concentration of chlorine-containing reagent equivalent in chlorine content to 20 to 2000 ppm by volume of HCl, the molar ratio of water to said equivalent HCl in said gaseous mixture being greater than about 10:1 to about 40:1.

7. The process of claim **5** wherein said catalyst additionally contains a platinum component.

3,904,511

PROCESS FOR ELIMINATING UNSTABLE HYDROGEN FROM LUBRICATING OIL STOCK

El-Ahmadi Ibrahim Heiba, Princeton, and Robert Frederick Bridger, Hopewell, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 5, 1973, Ser. No. 404,070
Int. Cl. C10g *29/02, 29/04, 29/10*
U.S. Cl. 208—177 **8 Claims**

1. A process for forming a stabilized lubricating oil resistant to oxidation and sludge formation upon exposure to a highly oxidative environment which comprises contacting a high boiling hydrocarbon fraction lubricating oil stock with elemental sulfur, said sulfur being added in an amount of from about 0.2 to about 1.0 percent by weight of said oil stock, said contacting including a catalyst material selected from the group consisting of a crystalline aluminosilicate zeolite, an amorphous sodium aluminosilicate, an oxide of a metal of Group II-B of the Periodic Table, alumina containing metals of Groups VI-B, VIII or combinations thereof, alumina containing a sulfide of a Group VIII metal, and silica, at a reaction temperature of from about 130° to about 250°C with evolution of hydrogen sulfide, said catalyst material being present in amount of from about 2 to about 15 parts by weight per 100 parts by weight of said oil stock.

4. The process of claim **1** wherein said contacting is in the presence of said catalyst material in conjunction with a secondary agent selected from the group consisting of bases.

3,904,512

METHOD FOR RECLAIMING USED CRANKCASE OIL

Trevor P. Clark, North Vancouver, Canada, assignor to British Columbia Research Council, Vancouver, Canada

Filed Dec. 26, 1973, Ser. No. 428,370
Int. Cl.² C10M *11/00*
U.S. Cl. 208—182 **7 Claims**

1. A process for reclaiming used crankcase oil comprising the steps of mixing and stirring said crankcase oil with about 3 to about 10%w of anhydrous zinc chloride, rapidly heating the mixture under vacuum to a temperature of 150° to 290°C for a time sufficient to free contaminants from the oil as vapor and sludge, separating the supernatent oil from said sludge, mixing activated clay with the separated oil, stirring and rapidly heating the oil-clay mixture under vacuum to a temperature and for a time sufficient to provide a desired color in the finished oil, and separating said oil from the clay sludge.

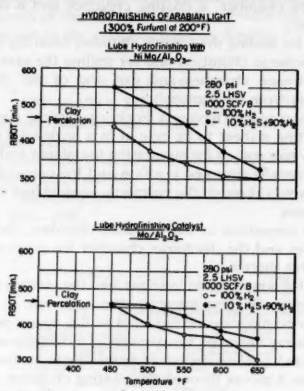
3,904,513

HYDROFINISHING OF PETROLEUM

Ronald H. Fischer; Donald Milstein, both of Cherry Hill, and Alan W. Peters, Moorestown, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 19, 1974, Ser. No. 452,589
Int. Cl. C10g *23/02*
U.S. Cl. 208—264 **8 Claims**

1. A method of improving the oxidative stability of a sulfur-containing hydrocarbon lubricant base stock comprising: contacting said lubricant base stock with a nickel-molybdenum on alumina catalyst having a major fraction of pores at least 100A diameter in the presence of a gas mixture of about 90% hydrogen and 10% hydrogen sulfide, said contacting



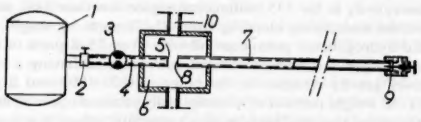
being carried out under hydrofinishing conditions; and removing said chargestock from said catalyst following said contacting.

3,904,514

GAS-COOLING PROCESS AND ITS USES

Philippe Albert Hippolyte Marchal, Boulogne; Jacques Louis Paul Simonnet, Gif-sur-Yvette, and Jean Prudent Fernand Rene Verrien, Paris, all of France, assignors to Bertin & Cie, Plaisir and Entreprise de Recherches et d'Activities Petrolieres (ELF), Paris, both of, France

Continuation of Ser. Nos. 201,993, Nov. 23, 1971, abandoned, Division of Ser. No. 845,018, July 25, 1969, Pat. No. 3,653,225. This application Jan. 7, 1974, Ser. No. 431,057.
The portion of the term of this patent subsequent to Apr. 4, 1989, has been disclaimed.
Int. Cl. C10g *5/06*
U.S. Cl. 208—340 **13 Claims**



1. A gas-cooling method comprising the steps of intermittently projecting a gas under pressure in the form of a gaseous jet through a free gap unductedly traversed by said jet into a pulse tube causing said jet to pulsate and allowing said gas to undergo intermittent temperature raising compression and temperature lowering expansion within said tube to separate the cooled gas from the hot gas, and thereafter tapping said cooled gas from an enclosed space communicating with said free gap.

3,904,515

HIGH YIELD REFUSE SEPARATION SYSTEM

Harold B. MacKenzie, Wheaton, Ill.; Ingvar G. Anderson, Dunedin, and William T. S. Montgomery, Jr., Jacksonville, both of Fla., assignors to New Life Foundation, Wheaton, Ill.

Filed May 1, 1974, Ser. No. 465,765
Int. Cl.² B07B *4/02*
U.S. Cl. 209—3 **18 Claims**

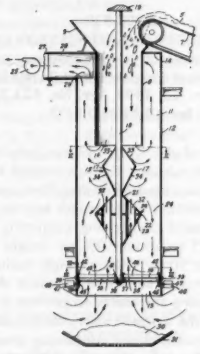
1. In a pneumatic refuse material separation system for separating lightweight material from heavier weight material: means providing a vertical separation chamber defined by an elongated tubular wall of substantial diameter which is unconstricted throughout its length to a free outlet opening at its lower end;

a tubular inlet through which material to be separated is received and which is of smaller diameter than the chamber and extends to a limited extent downwardly within the upper portion of the chamber, with a discharge end of the inlet opening freely downwardly within the chamber;

means for supplying material to be separated into said inlet to drop therefrom through said discharge end to descend through the chamber toward said outlet opening;

a supporting rod suspended at its upper end above the point at which said means supplying material introduces the material into said inlet, said rod extending concentrically downwardly through the inlet with the lower end of the rod projecting substantially below the discharge end of the inlet;

a spreader member suspended from the lower end of said rod a substantial distance below and concentric with the discharge end of said inlet and a substantial distance above said outlet opening and being of substantially the same diameter as said discharge end of the inlet and of smaller diameter than said wall and having convergently related conical upper and lower surfaces, the upper surface providing a spreader surface and the lower surface providing an air deflecting surface;



said surfaces meeting in annularly spaced relation to said wall and defining an annular venturi throat with said wall; said chamber providing an air flow passage upwardly through the chamber from said outlet opening to the top of the chamber;

means for effecting material-separating air flow upwardly through said outlet opening and said chamber passage and past said spreader member, through the venturi throat and then past said inlet and out from the top of the chamber, to separate the lightweight material from the heavier weight material;

means for receiving heavier weight material which drops from said outlet opening;

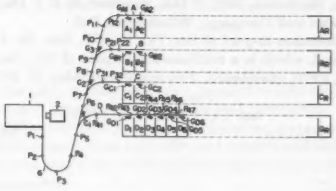
and means for assisting separation of the lightweight material from the heavier weight material including a steadying device connected to a lower end extension of said supporting rod which projects below said spreader member and comprising a transverse rod provided with a rotary peripheral surface and means for effecting rotation thereof.

3,904,516

APPARATUS FOR CLASSIFYING SHEET-LIKE WRITTEN MATERIAL

Kazuo Chiba, Tokyo, and Takenori Osanai, Yokohama, both of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Dec. 13, 1973, Ser. No. 424,285
Int. Cl. B07c *5/342*
U.S. Cl. 209—74 M **5 Claims**

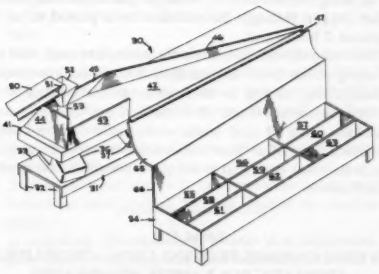
1. An apparatus for classifying sheet-like written material by transporting a series of sheet-like written pieces one by one on a passageway and collecting them in pockets provided therein which correspond respectively to a classification code indicated on the surface of a sheet-like written piece, characterized in that the apparatus comprises means for supplying data designating the pocket in which a particular sheet-like written piece traveling on the passageway is to be collected; means for supplying a current position of a sheet-like written piece which means includes a plurality of detectors each corresponding to each of the pockets and disposed along the passageway of the traveling written piece and supplies data on its current position; a memory device consisting of at least as many storing sections as written pieces jointly travelling on the

passageway at a given time, each section being stored with data designating a pocket associated with a travelling written piece and also with data on its current position during transit; means for replacing first current position data of the written piece already stored in one storing section by second or fresh current position data on the subsequent position which it takes in further transit, said second current position data being obtained from a code convertor which converts the output signal of a current position detector into a predetermined code; and means for comparing the stored pocket-designating data with the current position data and, when a prescribed coincidence is detected to exist between both data, receiving said written piece in a properly designated pocket.

3,904,517

METHOD OF AND APPARATUS FOR ASSORTING PARTICLES ACCORDING TO THE PHYSICAL CHARACTERISTICS THEREOF

Donald C. Wilson, San Jose, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Feb. 9, 1973, Ser. No. 330,896
Int. Cl. B03b *3/12*
U.S. Cl. 209—441 **16 Claims**



10. An apparatus for continuously assorting particles by phsyical characteristics thereof, said apparatus comprising a surface for supporting a stream of particles; a wall connected to one side of said surface and projecting upwardly therefrom to support one side of the particle stream with at least a portion of said wall overlying said surface; means for vibrating said surface to impart impulses to the particles thereon for

dirving said particles toward the wall; said surface having a width that decreases proportionally with the length of the wall to gradually reduce the transverse section of the particle stream; and a plurality of collecting compartments aligned transversely of the particle stream and in alignment with the edge of said surface opposite from that defined by said wall whereby said compartments receive particles from the surface in an order of classification with particles having similar physical characteristics being collected in the same compartment.

3,904,518

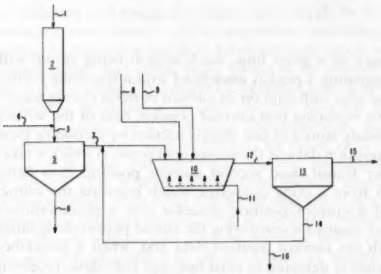
WASTE WATER TREATMENT PROCESS

David Glenn Hutton, Newark, and Francis Leonard Robertaccio, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 98,675, Dec. 16, 1970, abandoned, which is a continuation-in-part of Ser. No. 2,846, Jan. 14, 1970, abandoned. This application May 27, 1971, Ser. No. 147,399

Int. Cl.[2] C02C *1/06, 5/10*

U.S. Cl. 210—11 **10 Claims**



1. An improvement in the process of continuously purifying waste water to reduce the BOD, COD, and TOC thereof comprising

a. contacting in a treatment zone a mixture of

1. waste water which has a pH of between about 4 and 11 and which optionally has been subjected to primary treatment to remove solids, and
2. biologically active solids in an amount sufficient to provide a total suspended solids content of the mixture of between about 10 and 50,000 parts per million,

b. aerating the mixture by mixing a gas containing molecular oxygen through the mixture for a period of at least about 2 hours and

c. removing the mixture from the treatment zone and separating solids from the purified water; the improvement comprising adding to the mixture in the treatment zone between about 50 and 1500 parts of activated carbon per million parts of feed waste water, said carbon having a surface area of at least 100 square meters per gram and a prticle size such that it will pass through a 200 mesh per inch sieve.

3,904,519

REVERSE OSMOSIS PROCESS USING CROSSLINKED AROMATIC POLYAMIDE MEMBRANES

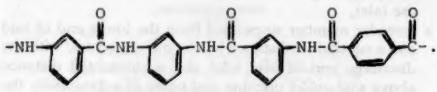
Ray McKinney, Jr, Raleigh, and William L. Hofferbert, Durham, both of N.C., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 19, 1971, Ser. No. 191,818

Int. Cl. B01d *13/00*

U.S. Cl. 210—23 **9 Claims**

1. In a process for desalination of saline water by reverse osmosis comprising contacting the saline water under pressure with a reverse osmosis membrane, the improvement comprising employing as the reverse osmosis membrane a membrane consisting essentially of linear aromatic polyamide molecules that have been crosslinked by treatment with a crosslinking agent whereby a plurality of said molecules are chemically linked together, said linear aromatic polyamide molecules being composed of groups having the formula:



3,904,520

PROCESS FOR THE CLARIFICATION OF BRINE

William B. Dancy, Carlsbad, N. Mex., assignor to International Minerals & Chemical Corporation, Libertyville, Ill.

Filed Nov. 13, 1974, Ser. No. 523,227

Int. Cl.[2] B01D *9/02*

U.S. Cl. 23—298 **11 Claims**

1. In the method of clarifying sylvinite brine wherein brine containing clay and sylvinite fines is settled in a thickener vessel to provide a clarified brine overflow and a thickened brine underflow enriched with respect to clay and sylvinite fines, the improvement comprising preparing a first slurry comprising about 25 to about 50% by weight of essentially clear sylvinite brine; 50 to 75% by weight halite tailings; and flocculent in an amount sufficient to assist the subsequent filtration step; agitating the slurry to provide a uniform mixture; and adding to the agitated slurry thickened brine underflow to provide a second slurry containing about 35 to about 75% thickened brine underflow; and filtering the second slurry to recover a clarified sylvinite brine.

3,904,521

METHOD AND APPARATUS FOR PURIFICATION

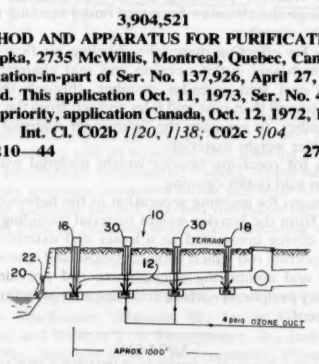
Karel Stopka, 2735 McWillis, Montreal, Quebec, Canada

Continuation-in-part of Ser. No. 137,926, April 27, 1971, abandoned. This application Oct. 11, 1973, Ser. No. 405,848

Claims priority, application Canada, Oct. 12, 1972, 153742

Int. Cl. C02b *1/20, 1/38;* **C02c** *5/04*

U.S. Cl. 210—44 **27 Claims**



1. A method of purifying flowing water containing waste comprising:

i. providing a chamber for said water to pass through,

ii. flowing water containing waste through said chamber and providing an ozone containing atmosphere above said water in said chamber,

iii. agitating the body of water as it flows through said chamber and propelling said water upwardly into said ozone

containing atmosphere and against the chamber walls to produce a film of said waste on said chamber walls and small droplets of said water in said atmosphere of a size sufficient to avoid the formation of a humid atmosphere of suspended droplets,

iv. allowing said small droplets and said film to contact said ozone containing atmosphere with consequent oxidation of said waste, and

v. recovering purified water.

18. Apparatus for purifying flowing water containing water comprising

a. a chamber having an inlet and outlet through which water may continuously flow,

b. a source of ozone containing atmosphere, said chamber having an inlet port connected to said source, said chamber having an outlet port for said atmosphere, said inlet and outlet ports being at an elevation above the elevation of said chamber inlet and outlet for water,

c. agitating and propelling means in said chamber for propelling water in the chamber into an ozone containing atmosphere in said chamber and against the chamber walls to produce a film of water on said chamber walls and small droplets of said water in said atmosphere of a size sufficient to avoid the formation of a humid atmosphere of suspended droplets.

d. at least one upstanding conduit having a discharge nozzle at its upper end for discharging water into said atmosphere, the other end of said conduit being connected to said agitating and propelling means for receiving water therefrom,

e. said agitating and propelling means having an inlet at an elevation so that it will be immersed in the body of water below the surface level thereof, and

f. whereby water flowing through said chamber will be agitated and propelled through said conduit into said atmosphere and returned to the body of water in said chamber.

3,904,522
PROCESS OF INHIBITING SCALE USING AN ACRYLIC COMPOSITION

George L. Greenfield, Houston, Tex., assignor to Milchem Incorporated, Houston, Tex.

Division of Ser. No. 244,952, April 17, 1972, Pat. No. 3,787,488. This application Oct. 24, 1973, Ser. No. 409,028

Int. Cl.² C02B *5/00*

U.S. Cl. 210—58 **11 Claims**

1. A process for inhibiting the formation of scale on a surface in contact with an aqueous system containing chemicals having a tendency to form said scale, which process comprises contacting said surface in an effective scale removing amount with an aqueous solution of an acrylic composition formed by reacting at a temperature of from 24° to 80°C. in an aqueous solution (1) acrylic acid of between 5% and 30% by weight of the total aqueous solution with (2) 2-mercaptoethanol of between 5% and 12% by weight of the acrylic acid utilized and with (3) amonium persulphate of between 2% and 5% of the acrylic acid used.

3,904,523
APPARATUS AND METHOD FOR SUBSTANTIALLY REMOVING DEBRIS FROM A SLURRY

Ronald J. Sierzega, 3405 Lehigh St., Whitehall, Pa. 18052

Filed Feb. 25, 1971, Ser. No. 118,856

Int. Cl.² B01D *35/02*

U.S. Cl. 210—79 **13 Claims**

1. A trap, for substantially removing debris from a slurry, comprising,

A. A T shaped hollow pipe fitting having

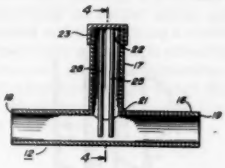
1. a serial section with an inlet end and an outlet end; and

2. a shunt section having

a. a first end engaging said serial section intermediate said inlet end and said outlet end; and

b. a second end adapted to receive a closure cap;

B. a closure cap adapted to engage said second end; and



C. a plurality of extending rods coupled to said closure cap having a length sufficient to extend completely through said shunt section and into said serial section so as to trap debris passing from said inlet end toward said outlet end, wherein said rods are coupled to said cap in a staggered relationship.

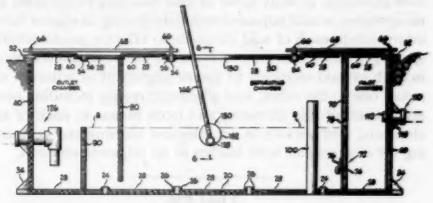
3,904,524
CONTAINER STRUCTURE

Sterling W. Pelton, Western Springs, and William M. Lynch, Glen Ellyn, both of Ill., assignors to Advanced Fibre-Glass, Ltd., West Chicago, Ill.

Filed June 11, 1973, Ser. No. 368,850

Int. Cl.² B01D *35/00;* **E04C** *1/00;* **B65D** *25/18;* **B65G** *5/00*

U.S. Cl. 210—94 **12 Claims**



1. A fluid separating container comprising:

a. a flat bottom frame formed of elongated wooden members;

b. side frames formed of elongated wooden members, attached to and extending upward from said bottom frame to define a space, said bottom member extending outwardly from said defined space and said side frames to define an anchor;

c. a top frame including a removable cover panel covering said side frames;

d. high density, closed cell, polyurethane foam panels attached to and carried by said frames to enclose said space;

e. a seamless, thermosetting plastic skin reinforced with glass fibers covering and mechanically bonded to the interior and exterior surfaces of said frames and said panels;

f. partitions within said frame defining an inlet chamber, separating chamber and outlet chamber, said chambers having an inlet for receiving fluids of different densities, and an outlet for the fluid of higher density; and

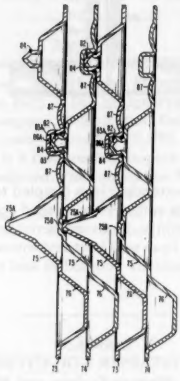
g. means within said container for providing visual indicia of the buoyancy force exerted on said container, and for acting as a relief valve to limit such force.

3,904,525

WASTE TREATMENT APPARATUS

Lawrence R. Rosenberg, 1 Chelsea Ridge Dr., Wappingers Falls, N.Y. 12590

Filed Aug. 23, 1973, Ser. No. 390,892
Int. Cl.² B01D 33/28
U.S. Cl. 210—150 6 Claims



1. Biological mass growing media for attachment to the rotor of a rotating biological reactor, said media comprising: a group of thin wedge-shaped elements each having opposite planar major surfaces and each surface having a pattern of protrusions and depressions therein; said elements of said group including coacting projections and receptacles in adjacent elements, at least some of said coacting projections and receptacles on said adjacent elements serving as spacer means intermediate each of said elements to effect a predetermined spacing of said elements one from the other; alignment means in each of said elements to insure alignment of adjacent elements one to the other, said alignment means including pockets in each of said elements and latch means in each of said elements; said pockets in one element aligning and cooperating for engagement with latches in an adjacent element.

3,904,526

MACHINE FOR RECONDITIONING COATED SPRAY MASKS

Harry Szczepanski, 755 Oakleigh, N.W., Grand Rapids, Mich. 49504

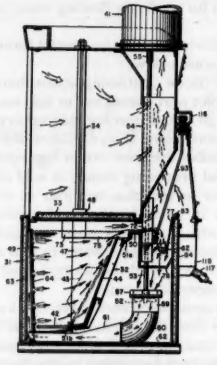
Filed Jan. 26, 1973, Ser. No. 326,974
Int. Cl.² B01D 35/16
U.S. Cl. 210—196 13 Claims

1. A cleaning machine including a tank having partition means with an elongated horizontal upper edge, and liquid-circulating means operative to induce a flow of liquid from one side of said partition to the other side thereof at a level substantially below the top of said partition, said flow returning over said top edge, wherein the improvement comprises: a filter formed of a liquid permeable flexible material having opposed side edges;

first means securing one of said side edges in laterally-spaced relationship to said partition; and

second means securing the other of said side edges in spaced relation to said first means whereby said filter between said first and second securing means normally depends into sling configuration and is disposed to receive liquid flow passing over said upper edge, said second means being constructed and arranged to be movable relative to said first means to elevate said other of said side edges for cleaning purposes.

7. A cleaning machine including a tank having partition means with an elongated horizontal upper edge, and liquid-circulating means operative to induce a flow of liquid from one side of said partition to the other side thereof at a level substantially below the top of said partition, said flow returning over said upper edge, wherein the improvement comprises:



a filter sling having one portion thereof secured in laterally-spaced relationship to said partition, said filter sling normally depending into sling configuration and being disposed to receive liquid flow passing over said upper edge; terminal means secured to said filter sling; and

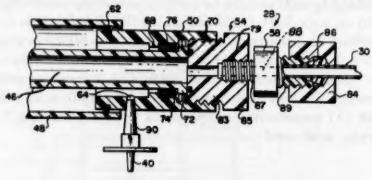
guide means for said terminal means establishing a path of movement of said terminal means from a lowered position placing said filter sling in position to receive said liquid flow passing over said partition upper edge to an elevated position raising one side of said filter sling.

3,904,527

CHROMATOGRAPHIC COLUMN

Jack L. Wilhelmson, and Douglas M. Grant, both of Lincoln, Nebr., assignors to Instrumentation Specialties Company, Lincoln, Nebr.

Filed Feb. 18, 1975, Ser. No. 550,420
Int. Cl.² B01D 15/08
U.S. Cl. 210—198 C 18 Claims



1. An apparatus comprising:

a central tubular column;

said central tubular column having a flange at least at one end;

sealing means having an inner surface with substantially the same shape and size as the outer surface of said central cylindrical column along a closed path adjacent to said flange and adapted to be positioned around said tubular column adjacent to said flange;

the outer diameter of said sealing means being greater than the outer diameter of said flange and the inner diameter

being approximately the same as the diameter of said central tube and less than the outer diameter of said flange;

at least one portion of said sealing means being rigid;

a sleeve having an edge with an inner diameter sufficiently large to fit over said flange and sufficiently small to contact said sealing means;

said sealing means being removable from said column;

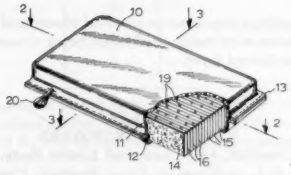
said sleeve including means for fastening an end fitting thereto in communication with the center of said central tube.

3,904,528

PICK-UP ELEMENT FOR OILY CONTAMINANTS

Charles H. Yocum, 463 Adamsville Rd., Westport, Mass. 02790

Filed June 29, 1973, Ser. No. 374,886
Int. Cl. C02b *9/02*
U.S. Cl. 210—242 **8 Claims**



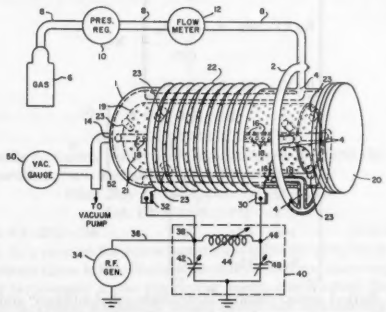
1. An element for picking up oily contaminant in liquid form from the surface of a body of water, comprising an outer container of porous material which is pervious to oily contaminants in liquid form and impervious to water, an absorber in said container and substantially filling said container, said absorber being a spongy material which will absorb oily contaminant and having large spaced parallel surfaces and a plurality of slits therethrough in the direction of the thickness thereof defining a plurality of wide flat strips, said slits extending from one end edge of said absorber to just short of the other end edge, and granules of absorbent material sprinkled over the surfaces of said absorber.

3,904,529

NEEDLE DEFECT DETECTOR APPARATUS FOR CIRCULAR KNITTING MACHINES

Isao Nakamura, Nishinomiya, Japan, assignor to Kazumasa Ashida and Shinko Electric and Instrumentation Co., Ltd., Osaka, Japan

Filed April 24, 1974, Ser. No. 463,536
Claims priority, application Japan, Apr. 27, 1973, 48/51441
Int. Cl.² G01N *21/30*
U.S. Cl. 250—561 **3 Claims**



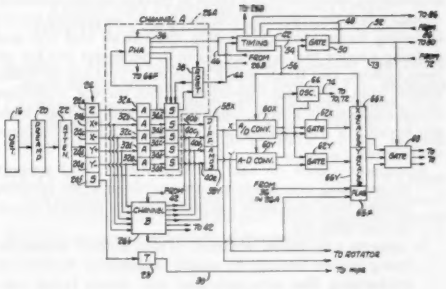
1. Apparatus for detecting defects of needles for a circular knitting machine comprising components including hooks and latch portions of dial and cylinders needles, comprising a light source, an optical fiber having an end disposed to detect light reflections of said light source from at least one of said components mounted on the circular knitting machine, a light receiver unit operatively coupled to the other end of said optical fiber and including a photo-electric converter element for producing an output signal, and an electrical circuit for receiving and transforming a variation in said output signal representative of said light reflections produced by said light receiver unit into a corresponding variation of an electrical signal, whereby a possible defect of said component is detected to thereby prevent knitting defects from being produced in the knitted web.

3,904,530

SCINTILLATION CAMERA

Ronald J. Martone, Cheshire; Peter G. Mueller, Guilford, both of Conn., and Robert Hindel, Weisbaden, Germany, assignors to Picker Corporation, Cleveland, Ohio

Continuation of Ser. No. 198,520, Nov. 15, 1971, abandoned, which is a continuation of Ser. No. 837,072, June 27, 1969, abandoned. This application Sept. 11, 1972, Ser. No. 287,623
Int. Cl. G01t *1/20*
U.S. Cl. 250—369 **38 Claims**



1. A display apparatus for use in a camera for producing a display representative of the spatial distribution of incident stimuli from a subject under investigation, the camera including a light-emitting element for emitting flashes of light in response to such incident stimuli and a plurality of light-responsive components, each of which emits analog electrical signals in response to light flashes incident upon it with such analog electrical signals each having an amplitude which is a function of the position of the light flash responded to, said display apparatus comprising:

a. an analog-to-digital converter for converting said analog electrical signals to digital signals indicative of positions of said flashes of light in said light-emitting element,

b. recording means for receiving and recording said digital signals;

c. playback means for playing back the recorded digital signals;

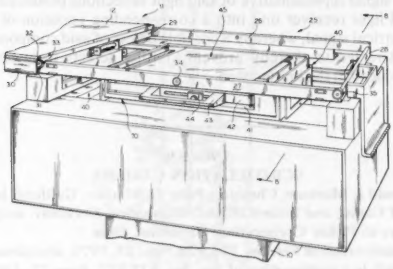
d. a digital-to-analog converter connected to said playback means for receiving and converting said digital signals into second analog signals, and,

e. display apparatus for providing a visual display of said radiation stimuli represented by said second analog signals in positions that correspond to locations of said stimuli in said subject to provide an image of the stimuli from said subject.

3,904,531
X-RAY TABLE WITH BUCKY ELEVATOR

David M. Barrett, Brookfield, and Alan R. Stenicka, Milwaukee, both of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 5, 1973, Ser. No. 412,589
Int. Cl. G01n *21/00*
U.S. Cl. 250—444 7 Claims



1. In diagnostic x-ray apparatus including an x-ray permeable table top arranged for cooperating with an x-ray tube which is positionable on one side of said top for accommodating a diagnostic subject between said tube and table top, means supporting said table top for bidirectional lateral and longitudinal movements in a plane to thereby enable a subject on said top to be positioned selectively, said supporting means including frame means extending away from said top and defining a space that is closed about its perimeter and has an open bottom, said frame means supporting said top on a side remote from the patient supporting surface thereof, a carriage means mounted for moving longitudinally relative to said table top beneath it and independently thereof, the improvement comprising:

a. support means on said carriage means, said support means being selectively movable between a first position remote from said table top and a second position closer to said table top,

b. cassette tray means mounted on said support means for being moved laterally to enable withdrawal thereof for exchanging film cassettes, said tray means being constructed and arranged to support a film cassette, said tray means supporting a film cassette within said space defined by said frame means when said support means is in said second position and said tray means supporting said cassette below said frame means and said space when said support means is in said first position,

c. withdrawal of said cassette tray means being interfered with by said table top frame means when said support means is in its second position and being clear of said frame means when in its first position, and

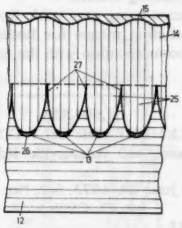
d. selectively operable means for moving said support means between its first and second positions relative to said carriage means.

3,904,532
INLET SCREEN FOR INTENSIFYING X-RAY IMAGES

Hermann Christgau, Furth; Wolfgang Schubert, Frauenaurach, and Aribert Stachowiak, Erlangen, all of Germany, assignors to Siemens Aktiengeselischaft, Munich, Germany

Filed Feb. 8, 1974, Ser. No. 440,707
Claims priority, application Germany, Feb. 13, 1973, 2307026
Int. Cl. H01j *1/62*
U.S. Cl. 250—483 5 Claims

1. An inlet screen for intensifying X-ray images, comprising a carrier, a layer carried by said carrier and adapted to luminesce under the action of X-rays, a photocathode connected with said layer, and another layer located between said carrier and the first-mentioned layer and absorbing the light of the first-mentioned layer, said carrier being roughened prior to the application of the second-mentioned layer, the depth of



the roughening ranging between 3 and 40 μm, said roughening forming holes with bases, said bases being covered with the second-mentioned layer.

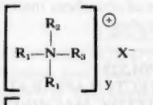
3,904,533
FABRIC CONDITIONERS

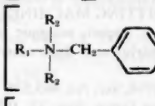
Oscar W. Neiditch, Fair Lawn, and Jerome Rudy, Livingston, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

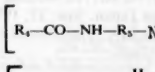
Continuation-in-part of Ser. No. 295,543, July 16, 1963. This application Sept. 14, 1970, Ser. No. 72,168
Int. Cl.[2] D06M *0/00*
U.S. Cl. 252—8.8 16 Claims

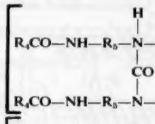
1. An aqueous emulsion consisting essentially of the following components in approximately the following proportions by weight:

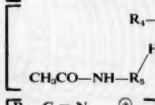
a. a fabric softening compound selected from the group consisting of

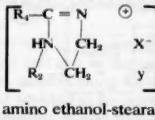
(1) 

(2) 

(3) 

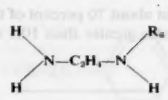
(4) 

(5) 

(6) 

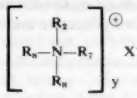
7. diethyl amino ethanol-stearamide-ethyl sulfates; and

8. the reaction product of about 2 moles of an acid of the formula R_4COOH and about 1 mole of an alkylene diamine having the formula:



said reaction product being a mixture of amides, esters and imidazolines wherein R_1 is an aliphatic hydrocarbon group containing from 16 to 20 carbon atoms, R_2 is an alkyl group containing from 1 to 3 carbon atoms, R_3 is selected from the group consisting of R_1 and R_2, R_4 is an aliphatic hydrocarbon group containing from 15 to 19 carbon atoms, R_5 is an alkylene group containing from 1 to 2 carbon atoms, R_6 is a hydroxyalkyl group containing from 1 to 3 carbon atoms, X is an anion selected from the group consisting of halides, sulfates, alkyl sulfates having 1 to 3 carbon atoms in the alkyl group, and acetates, and y is the valency of X, the total amount of compounds (1) to (8) present being between 4% and 7%;

b. from about one-fourth % to about 2% of a low temperature stabilizing agent of the formula:



wherein R_7 is an aliphatic hydrocarbon group containing from 10 to 14 carbon atoms, each R_8 is selected from the group consisting of R_2 and R_7, and R_2, X and y are as hereinabove defined;

c. from about 0.005% to about 0.10% of inert ionizable salts selected from the group consisting of inorganic salts and salts of organic acids containing from 1 to 4 carbon atoms;

d. not more than about 1% of a lower unsubstituted aliphatic alcohol;

e. from 0 to 1% of a supplementary emulsion stabilizer selected from the group consisting of N-lauryl-β-amino propionic acid, dimethyl coco amine oxide, the polyoxyethylene ester of tall oil having 8 to 30 ethylene oxide units, polyoxyethylene sorbitan monostearate containing 6 to 20 ethylene oxide units, dodecyl methyl sulfoxide, the condensates of straight and branched chain unsubstituted aliphatic alcohols having from 8 to 20 carbon atoms with from 1 to 30 moles of ethylene oxide, and alkyl phenol-ethylene oxide condensates having 8 to 12 carbon atoms in the alkyl chain and 8 to 30 ethylene oxide units;

f. an amount of water sufficient to make 100%.

3,904,534

GREASE MANUFACTURE

Francis S. Sayles, Rocky Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed July 1, 1974, Ser. No. 484,909

Int. Cl. C10m *5/16, 5/12*

U.S. Cl. 252—36 **15 Claims**

1. In a process for manufacturing a calcium complex grease in which there is incorporated an ethylene-vinyl ester-organic acid terpolymer as an improving agent, the method for improving grease formation which comprises introducing said terpolymer to the charge of lubricating vehicle and thickening agent components prior to saponification.

3,904,535

PHOSPHOSULFURIZED LUBRICATING OIL ADDITIVES

Chester D. Gordon, El Sobrante; Warren Lowe, El Cerrito, and Bruce W. Hotten, Orinda, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 164,871, July 26, 1971, abandoned. This application Nov. 19, 1973, Ser. No. 417,433

Int. Cl. C10m *1/48*

U.S. Cl. 252—46.6 **5 Claims**

1. A lubricating composition comprising a major amount of an oil of lubricating viscosity, and in an amount sufficient to impart EP properties to said lubricating composition, a lubricating oil additive produced by reacting a mixture of a C_{10}–C_{20} olefin and polyolefin of average molecular weight of from about 800 to about 1,400 in a mol ratio of olefin to polyolefin of about 1–5:4–1, with phosphorous sulfide in a weight ratio of said mixture to phosphorous sulfide of about 1–10:1 at a temperature of about 100°–300°C for about 2–8 hours to form a first product;

contacting said first product with a C_{10}–C_{25} alkanol at about 140°–175°C for about 2–8 hours to form a second product; and contacting said second product with a C_2–C_{25} epoxide at about 20°–100°C for about 0.1–4 hours.

3,904,536

LUBRICANT COMPOSITIONS CONTAINING PHOSPHATES OF FUSED RING HALO-AROMATIC COMPOUNDS

Stephen J. Metro, Scotch Plains; Harold Shaub, New Providence, both of N.J., and Frank Tao, Baytown, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 245,627, April 19, 1972, abandoned. This application July 15, 1974, Ser. No. 488,574

Int. Cl.[2] **C10M** *1/48, 3/42, 5/24, 7/46*

U.S. Cl. 252—46.7 **9 Claims**

1. A lubricating composition comprising a major amount of a mineral lubricating oil and a minor, load improving amount of a halo-aromatic phosphate of the formula

wherein Ar is an aromatic moiety group containing at least 2 fused aromatic rings; E, Y and Z are each oxygen or sulfur atoms; X is a halogen atom bonded directly to a carbon atom of said rings; n is an integer between 1 and 4; and R and R′ are each C_1 to C_n alkyl groups.

3,904,537

NOVEL DISULFIDES DERIVED FROM 1,2,4-THIADIAZOLE

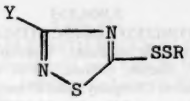
David Eugene Ripple, Willoughby Hills, Ohio, assignor to The Lubrizol Corporation, Cleveland, Ohio

Division of Ser. No. 249,806, May 3, 1972, Pat. No. 3,821,236. This application Feb. 22, 1974, Ser. No. 444,623

Int. Cl. C10m *1/38, 3/32*

U.S. Cl. 252—47.5 **7 Claims**

1. A lubricating composition comprising a major amount of a lubricating oil and a minor amount of a compound having the formula



wherein R is a hydrocarbon radical and Y is halogen or SSR.

3,904,538
METHOD OF PRODUCING FERROMAGNETIC CHROMIUM DIOXIDES

Takeshi Katada; Tatsuji Kitamoto, and Goro Akashi, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara, Japan

Continuation-in-part of Ser. No. 11,035, Feb. 12, 1970, abandoned. This application Aug. 28, 1972, Ser. No. 284,003
Claims priority, application Japan, Feb. 12, 1969, 44-10250
Int. Cl.[2] C01G *37/02*; C04B *35/12*
U.S. Cl. 252—62.51 6 Claims

1. A method of producing high coercive force ferromagnetic chromium dioxide of improved coercivity consisting essentially of:

a. heating CrO_3 or a mixture of CrO_3 with an additive comprising an oxide, chloride or nitrate of Te, Sb, Pt, Fe, Co, Ni, Se, Li, Na, K, Be, Mg, Al, Ga, In, Ge, Sn, As, Cu, Zn, Sc, Ti, Zr, Nb, and Mn at a temperature higher than 100°C and at a pressure of from 0.1 to 0.95 atmosphere of absolute pressure; and

b. heating a mixture of CrO_3 and the product of step (a) at a temperature of above 150°C and at a pressure of from 10 to 600 atmospheres in an aqueous medium.

3,904,539
INSULATION HAVING A REDUCED THERMAL CONDUCTIVITY

David L. Ruff, Harbor City, Calif., assignor to Grefco, Inc., Bala Cynwyd, Pa.

Filed Jan. 2, 1973, Ser. No. 320,504
Int. Cl.[2] C04B *43/12*
U.S. Cl. 252—62 11 Claims

1. A thermal insulation board having a reduced coefficient of thermal conductivity in the range of about 0.333 to about 0.342 in the absence of mineral fibers consisting essentially of: a thermally expanded mineral aggregate wherein at least a portion of said thermally expanded mineral aggregate has been milled at least once to reduce particle size;

a defibrated organic fibrous material;

and an optional sizing agent or combination binder-sizing agent.

3;904,540
MAGNETIC IMPULSE RECORD MEMBER

Leonard M. Bennetch; Harry S. Greiner, both of Bethlehem; Kenneth R. Hancock, Easton, all of Pa., and Mark Hoffman, Phillipsburgh, N.J., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 225,636, Feb. 11, 1972, which is a continuation-in-part of Ser. No. 125,331, March 17, 1971, abandoned. This application June 18, 1973, Ser. No. 370,633
Int. Cl.[2] H01L *1/00*, *1/22*
U.S. Cl. 252—62.54 1 Claim

1. A magnetic impulse record member comprising a binding medium having therein synthetic magnetic gamma ferric oxide, said member characterized by having an orientation ratio of at least 2.4 in a 1000 oersted field, said ferric oxide produced from synthetic lepidocrocite by coating the lepidocrocite particles with at least one hydrophobic aliphatic monocarboxylic acid having 8–24 carbon atoms, reducing and oxidizing the coated lepidocrocite, and mechanically densifying the gamma ferric oxide product, said synthetic lepidocrocite characterized by having very fine-grained, needle-like crystalline particles with at least about 70 percent of the particles having a length to width ratio greater than 10:1 and a length up to about 2 microns.

3,904,541
TRANSMISSION CABLE FILLING COMPOUND

John R. Charlton, Scarborough, Canada, assignor to Hexcel Corporation, Dublin, Calif.

Filed July 13, 1973, Ser. No. 379,153
Int. Cl.[2] H01B *3/00*
U.S. Cl. 252—63.2 8 Claims

5. A composition useful as a filler in communication transmission cables comprising from 10 to 50 parts of a polybutene resin having a viscosity in the range of 500–20,000 S.U.S. at 20°C and from 50 to 90 parts by weight of an inert polymeric powder of from 5 to 100 microns mesh size having a softening temperature above 150°F and a dielectric constant below about 5, wherein said polymeric powder is selected from the group consisting of cellulosic materials and addition polymers of ethylene, propylene, vinyl acetate and vinyl chloride.

3,904,542
AZEOTROPIC COMPOSITION OF FLUOROCARBON

Robert E. Reusser, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Mar. 6, 1973, Ser. No. 338,417
Int. Cl.[2] C23G *5/02*
U.S. Cl. 252—171 6 Claims

1. A substantially constant boiling admixture of (A) 1,2-dichloro-1-fluoroethane, (B) acetone, and (C) methanol, characterized by a weight percent ratio of about 25 to 41 (A), about 25 to 33 (B), and about 26 to 40 methanol.

3,904,543
DETERGENT FILM

James G. Knighten, Simpsonville, S.C., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Aug. 7, 1973, Ser. No. 386,343
Int. Cl.[2] C11D *1/70*, *3/37*, *11/00*, *17/06*
U.S. Cl. 252—174 1 Claim

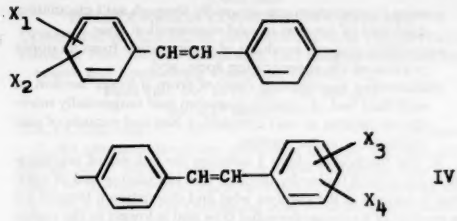
1. A pliant, non-tacky, self-sustaining film having a water content of about 2% by weight and formed by casting upon a receptive surface to permit evaporation of water from a solution consisting of about 83 parts of water, 10 parts of an ethoxylated nonyl phenol having from 9–10 mols of ethylene oxide, 4 parts of methyl vinyl ether maleic anhydride copolymer, and about 3 parts of a 20% w/w sodium hydroxide solution; said solution being heated to about 195°F. for about thirty minutes, then cooled to the point of clarity at which the pH is about 4.0–4.4.

3,904,544
TREATMENT OF OPTICAL BRIGHTENING AGENTS

David Ronald Clark, and Thomas Gerald Hyde, both of Broolands, Sale, England, assignors to Ciba-Geigy AG, Basel, Switzerland

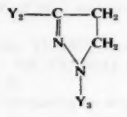
Filed Sept. 27, 1972, Ser. No. 292,705
Claims priority, application United Kingdom, Oct. 2, 1971, 45933/71; Oct. 2, 1971, 45934/71; Oct. 2, 1971, 45935/71; Oct. 20, 1971, 45936/71
Int. Cl. C09k *1/02*
U.S. Cl. 252—301.2 W 56 Claims

1. An aqueous process in which a thixotropic slurry is prepared containing from 15% to 60% by weight based on the total weight of slurry of a compound having the formula:



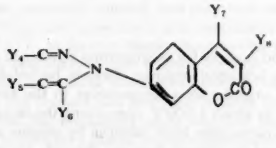
IV

wherein X_1 is a sulphonic acid radical or its alkali metal sale, X_2 is hydrogen, a sulphonic acid radical or its alkali metal salt, halogen, alkyl with 1 to 4 carbon atoms or the carboxylic acid group or its alkali metal salt, X_3 is hydrogen, a sulphonic acid radical or its alkali metal salt, halogen, alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms, a carboxylic acid group or its alkali metal salt, carbalkoxy with 2 to 5 carbon atoms or cyano and X_4 is hydrogen, a sulphonic acid radical or its alkali metal salt, halogen, alkyl with 1 to 4 carbon atoms or alkoxy with 1 to 4 carbon atoms, or a compound having the formula



II

wherein Y_2 is a substituted or unsubstituted phenyl radical and Y_3 is a phenyl radical substituted in the para position by an alkyl carboxylate group containing from 1–4 carbon atoms in the alkyl radical, or a cyano group, or a carbonamide group or a carbonamide group substituted by low alkyl groups, or an unsubstituted or substituted sulphonamide group or an alkylsulphonyl group or substituted in the meta position by fluorine, chlorine or bromine, or a compound having the formula



III

wherein Y_4 is hydrogen, an alkyl radical having 1–5 carbon atoms or phenyl, Y_5 is hydrogen, chlorine or phenyl, Y_6 is hydrogen or a low alkyl radical, Y_7 is hydrogen and Y_8 is phenyl or phenyl substituted by methyl or chlorine, or is a sulphonic acid group, a sulphonamide group or a substituted sulphonamide group, by mixing the wet filter-cake obtained during the preparation of a said compound with 0.1% to 5.0% by weight based on the weight of the net filter-cake of an anionic, cationic or non-ionic surface-active agent so that the resultant slurry is thixotropic and therefore has reduced tendency to settle out on static storage and has a Brookfield viscosity at equilibrium from 2,000 to 10,000 centipoise at 6 revolutions per minute, 1,000 to 3,500 centipoise at 12 revolutions per minute and up to 2,000 centipoise at 60 revolutions per minute.

3,904,545

LIQUID DYE PENETRANT COMPOSITION CONTAINING A WAX

Orlando G. Molina, Westminster, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Division of Ser. No. 329,774, Feb. 5, 1973, Pat. No. 3,786,225. This application Oct. 3, 1973, Ser. No. 403,292

Int. Cl.[2] C01N *21/16*; C09K *11/06*; G09K *3/00*

U.S. Cl. 252—301.2 P 8 Claims

1. A liquid dye penetrant composition for use in nondestructive testing for detecting cracks and flaws in a specimen surface, which consists essentially of a wax selected from the group consisting of paraffin wax, carnauba wax and beeswax, a dye, and about 50 to about 95 percent by volume of said dye penetrant composition, of a volatile solvent selected from the group consisting of 1,1,1-trichloroethane, trichloroethylene, 1,1,2-trichloro-1,2,2-trifluoroethane, trichlorofluoromethane and bromotrifluoromethane, said wax was being compatible with said dye and with said solvent, said wax together with said dye being dissolved in said solvent on heating thereof, the total amount of of said wax and said dye in said composition ranging from about 5 percent to about 45 percent, by volume of said dye penetrant composition, the ratio of said wax to said dye in said composition ranging from about 0.5 part of wax to about 5 parts of dye, to about 5 parts of said was to about 1 part of dye, by volume.

3,904,546

SILICON SENSITIZED RARE EARTH OXYSULFIDE PHOSPHORS

James J. Mattis, Long Valley, and Melvin Tecotzky, Mendham, both of N.J., assignors to United States Radium Corporation, Morristown, N.J.

Continuation-in-part of Ser. No. 185,891, Oct. 1, 1971, abandoned. This application Aug. 27, 1973, Ser. No. 392,108

Int. Cl.[2] C09K *11/14*, *11/20*, *11/24*, *11/46*

U.S. Cl. 252—301.4 S 14 Claims

1. A rare earth oxysulfide phosphor consisting essentially of a rare earth oxysulfide matrix of the formula $M_{2-x}O_2S{:}xA$ wherein M is at least one rare earth element selected from the group consisting of lanthanum, gadolinium and yttrium, A is at least one rare earth activator selected from the group consisting of praseodymium, neodymium, samarium, europium, terbium, dysprosium, holmium, erbium, ytterbium, and thulium, and x is 0.001 to 0.1, silicon incorporated in said matrix in an amount from about 10 to 1000 p.p.m. based on phosphor weight and when M is gadolinium or yttrium, fluorine incorporated in said matrix in an amount from about 20 to 500 p.p.m.

3,904,547

PROCESS FOR RECYCLING A COBALT HYDROFORMYLATION CATALYST

David F. Aycock, Lenox, and Daniel E. Sliva, Pittsfield, both of Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed June 6, 1973, Ser. No. 367,551

Int. Cl.[2] B01D *15/06*; B01J *37/00*

U.S. Cl. 252—414 9 Claims

1. In an improved process for recycling a cobalt hydroformylation catalyst from a hydroformylation reaction wherein an olefinic compound is reacted with carbon monoxide and hydrogen in the presence of a cobalt hydroformylation catalyst dissolved in an inert organic solvent in a reaction zone under hydroformylation conditions to produce a hydroformylation product comprising a hydroformylation compound and the cobalt hydroformylation catalyst, wherein the improvement comprises the steps of:

a. feeding the hydroformylation product into a separation zone wherein two phases are formed, an upper or solvent phase containing the cobalt hydroformylation catalyst and a lower phase containing the cobalt hydroformylation catalyst and the hydroformylation compound;

b. then separating the lower phase therefrom and feeding it into a countercurrent extractor with an inert organic solvent to remove the cobalt hydroformylation catalyst therefrom;

c. then passing the upper or solvent phase from the separation zone and the cobalt hydroformylation catalyst from the countercurrent extractor into an evaporation zone to remove solvent therefrom to form a concentrated solution of the cobalt hydroformylation catalyst;

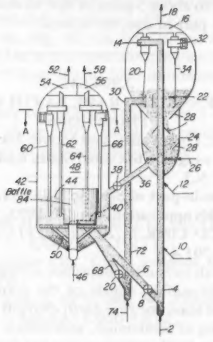
d. then recycling the concentrated cobalt hydroformylation catalyst into the initial reaction zone.

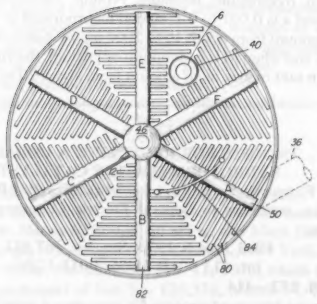
3,904,548

REGENERATING CATALYST WITH TANGENTIAL INTRODUCTION AND CIRCUMFERENTIAL SWIRL IN A FLUIDIZED BED

Frank N. Fagan, Furlong, Pa.; Joe E. Penick, Chappaqua, N.Y., and Klaus W. Schatz, Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sept. 10, 1973, Ser. No. 395,816
Int. Cl. B01j *11/68;* **C10g** *11/18*
U.S. Cl. 252—417 **4 Claims**





1. In a hydrocarbon conversion-catalyst regeneration operation in the presence of fluidizable catalyst particles, the improved method of regenerating the catalyst which comprises, maintaining a dense fluid bed of catalyst particles circulating circumferentially in a catalyst regeneration zone,

introducing catalyst particles obtained from a hydrocarbon conversion operation after stripping thereof into said regeneration zone tangentially to said circulating bed of catalyst in a restricted annular section expanding in the direction of catalyst circulation, said annular section formed by a curved upwardly extending baffle spaced inwardly from the outer wall of the regeneration zone,

passing regeneration gas upwardly through said circulating fluid bed of catalyst in said regeneration zone,

recovering gaseous products of regeneration from an upper portion of the regeneration zone, and

withdrawing regenerated catalyst from a lower section of said fluid bed of catalyst upstream said tangentially introduced catalyst to said circulating bed and outside of said restricted annular section.

3. The method of claim **1** wherien the volume of regeneration gas passed upwardly through said circulating bed of catalyst is highest at the catalyst inlet and downstream thereof for a portion of its circumferential flow and is lowest in the region of regenerated catalyst withdrawal from the fluid bed of catalyst.

4. The method of claim **1** wherein the density of the circumferentially circulating fluid bed of catalyst in the regeneration zone is lowest in an initial portion of the circulating catalyst flow pattern and highest near the catalyst withdrawal.

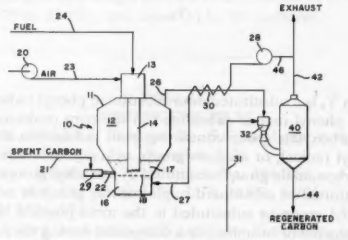
TMO

3,904,549

FLUIDIZED BED REGENERATION OF POWDERED ACTIVATED CARBON

William W. Barton, Stamford, and Thomas D. Heath, Westport, both of Conn., assignors to Dorr-Oliver Incorporated, Stamford, Conn.

Filed Nov. 23, 1973, Ser. No. 418,603
Int. Cl.[2] B01D *15/06;* **B01J** *37/12, 37/00*
U.S. Cl. 252—417 **8 Claims**



1. A fluid bed process for regenerating powdered activated carbon having adsorbed organics thereon by volatilizing or oxidizing said organics at a temperature in the range from about 1,150°F to about 1,500°F, comprising the steps of fluidizing a bed of particulate inert material by passing a primary flow of substantially oxygen-free gas through a constriction plate supporting said bed, charging a water slurry of spent carbon into the fluidized bed, introducing through a burner tube a secondary flow of hot combustion gases containing a controlled amount of excess oxygen therein directly into the fluidized bed at a location within the fluidized bed and substantially above said constriction plate to raise the bed temperature to the desired range and thereby volatilize the organis and to oxidize nonvolatile adsorbates, removing the reactivated carbon powder from the reactor by elutriation with the reactor exhaust gases, separating the carbon powder from the exhaust gases and recovering the powdered activated carbon.

2. The process of claim **1** wherein said hot combustion gases do not traverse said constriction plate and said excess oxygen is present in said hot combustion gases in an effective amount of up to about 5 to 10 percent.

3,904,550

HYDROCARBON CONVERSION CATALYST COMPRISING ALUMINA AND ALUMINUM PHOSPHATE

Lloyd A. Pine, Greenwell Springs, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed Oct. 19, 1973, Ser. No. 408,041

Int. Cl.[2] B01J *27/18*

U.S. Cl. 252—437 4 Claims

1. An alumina-aluminum phosphate catalyst support containing 35 to 85 wt. percent aluminum phosphate and prepared by the reaction in aqueous medium of aluminum alkoxide with a phosphorus-containing acid or soluble salt thereof at an aluminum alkoxide/phosphate ion molar ratio in the range of 26:1 to 1.2:1, said phosphorus-containing acid having the formula:

wherein R represents a hydroxyl group, hydrogen or a hydrocarbon radical containing from 1 to 12 carbon atoms.

3,904,551

PROCESS FOR PREPARING AN AUTO EXHAUST CATALYTIC CONVERTER

Christian Bent Lundsager, Ashton, and Francis John Sergeys, Kensington, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Dec. 19, 1973, Ser. No. 426,349

Int. Cl.[2] B01J *35/00*

U.S. Cl. 252—455 R 4 Claims

1. A process for preparing an engine exhaust catalytic converter having a portion adapted to pass the exhaust and a portion adapted to substantially prevent passage of the exhaust, which comprises:

a. homogeneously blending a composition consisting essentially of 5–70 volume percent of a polyolefin having a molecular weight of at least 150,000 and a standard load melt index of substantially zero; 15–80 volume percent of a ceramic filler selected from the group consisting of alumina, mullite, zircon mullite, magnesium aluminate spinel, and cordierite, and 15–80 volume percent of a plasticizer selected from the group consisting of mineral oil, diethylene glycol, propylene glycol, dipropylene glycol, glycerin, glycerol monoacetate, trimethylene glycol, tetramethylene glycol, 2,3-butylene glycol, triethyl phosphate, polyvinyl alcohol, and polyvinyl pyrrolidone;

b. molding said composition at a temperature of about 300° to 550°F. to form a plastic sheet having ribs in substantially uniformly spaced relation thereon;

c. rolling said plastic sheet about itself so that free ends of said ribs contact said sheet and heating the sheet surface to fuse the contacting areas together thermoplastically and to provide a plastic ceramic structure having a plurality of through holes substantially throughout, said holes being defined by oppositely facing walls of adjacent ribs, first sheet surfaces facing intermediate fused areas of said adjacent ribs, and second sheet surfaces facing said first sheet surfaces;

d. cutting the plastic structure to remove a section thereof having a preselected size and shape and having a plurality of through holes substantially throughout and substantially as defined above;

e. extracting said plasticizer from the section with water or an organic solvent;

f. sealing the through holes in the periphery of said structure section to substantially prevent passage of exhaust through the sealed holes and to render the surfaces defining said sealed holes substantially non-available for contact by coating media external to said holes;

g. heating the resulting ceramic structure to about 240° to 700°C. to burn off the polyolefin component and increase the porosity of the structure;

h. firing the porous ceramic structure at a temperature of from about 1300° to about 1450°C. for a time sufficient to sinter said porous ceramic structure; and

i. impregnating the porous ceramic structure with solutions of soluble salts of metals exhibiting catalytic activity for converting engine exhaust gases and heating to convert the metals to the active form.

3,904,552

DEHYROGENATION CATALYST

Francis Joseph O'Hara, Louisville, Ky., assignor to Girdler Chemical Inc., Louisville, Ky.

Filed Mar. 8, 1973, Ser. No. 339,304

Int. Cl.[2] B01J *29/00, 23/64, 23/84, 29/06*

U.S. Cl. 252—458 8 Claims

1. A catalyst for the production of an olefinically unsaturated hydrocarbon or pyridine by dehydrogenation of the corresponding more saturated compound consisting essentially of from about 30 to about 90% of iron oxide, from about 1% to about 40% of a compound selected from the group consisting of the oxides, hydroxides, carbonates and bicarbonates of an alkali metal, from about 0.5% to about 5% of molybdenum oxide and from about 0.5% to about 10% of cerium oxide.

3,904,553

THERMALLY STABLE COMPOSITE BASE METAL OXIDE CATALYSTS

Larry E. Campbell, Corning, and Robert L. Johnson, Beaver, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Aug. 20, 1973, Ser. No. 389,969

Int. Cl.[2] B01J *23/16, 23/62, 23/82, 23/84*

U.S. Cl. 252—465 7 Claims

1. A process of stabilizing a base metal oxide catalyst of spinel structure selected from the group consisting of Co_3O_4, $CoFe_2O_4$, $CoMn_2O_4$, $CuCr_2O_4$, $CuFe_2O_4$, $CuMn_2O_4$, $CuCo_2O_4$ and $ZnCo_2O_4$ against high temperature degradation which comprises reacting said catalyst prior to use with a refractory high-surface-area spinel selected from the group consisting of $NiAl_2O_4$, $MgAl_2O_4$, $ZnAl_2O_4$, $CoAl_2O_4$, $CuAl_2O_4$, $CdAl_2O_4$, $MnAl_2O_4$, $NiCr_2O_4$, $CoCr_2O_4$ and $MgCr_2O_4$ to provide a stable composite catalyst material comprising a solid solution which consists essentially of said base metal oxide catalyst in solid solution with said refractory high-surface-area spinel.

4. A thermally stable composite catalyst comprising a solid solution which consists essentially of at least one base metal oxide catalyst of spinel structure in solid solution with at least one refractory high-surface-area spinel, said base metal oxide catalyst being selected from the group consisting of Co_3O_4, $CoFe_2O_4$, $CoMn_2O_4$, $CuCr_2O_4$, $CuFe_2O_4$, $CuMn_2O_4$, $CuCo_2O_4$ and $ZnCo_2O_4$, and said refractory high-surface-area spinel being selected from the group consisting of $NiAl_2O_4$, $MgAl_2O_4$, $ZnAl_2O_4$, $CoAl_2O_4$, $CuAl_2O_4$, $CdAl_2O_4$, $MnAl_2O_4$, $NiCr_2O_4$, $CoCr_2O_4$, and $MgCr_2O_4$.

3,904,554

CATALYST OF RUTHENIUM AND ZINC OXIDE ON ALUMINA CARRIER FOR STEAM REFORMING HYDROCARBONS

Andrew Leslie Dicks, Solihull, England, assignor to British Gas Corporation, London, England

Filed Jan. 26, 1973, Ser. No. 327,229

Claims priority, application United Kingdom, Jan. 27, 1972, 3889/72

Int. Cl.[2] B01J *23/62, 23/60*

U.S. Cl. 252—466 PT 4 Claims

1. A catalyst composition for steam reforming hydrocarbons to produce gases containing a major proportion of meth-

ane, said composition comprising (i) from 1 to 20% by weight of the total composition of ruthenium, (ii) from 30 to 50% by weight of the total composition of zinc oxide and (iii) from 65 to 35% by weight of the total composition of alumina carrier, said catalyst being prepared by coprecipitation from a solution of water soluble salts of ruthenium, zinc and aluminium.

3,904,555

WELDABLE PAINT COMPOSITION

Shozo Matsuda, Tokyo; Tadashi Tanaka, and Akira Okamoto, both of Yokohama, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Oct. 5, 1972, Ser. No. 295,199
Int. Cl. H01b 1/00
U.S. Cl. 252—503 7 Claims

1. In a weldable paint composition comprising a film forming resin and a conductive metal, the improvement wherein the metal comprises a mixture of a soft metal selected from the group consisting of Al, Zn, Pb, Cu, Cd, Mg, Ag, Sn, and alloys of said soft metals with each other; and a hard metal selected from the group consisting of Fe, Ni, Co, Cr, Mn, and alloys of said hard metals with each other; the ratio of hard metal to soft metal being from 1:4 to 4:1, and the particle size of the metal mixture being finer than 200 mesh, the mixture being suitable for application to steel prior to press forming and welding and being non-conductive and becoming conductive only when a pressure of 30 kg/cm² is applied thereto and providing good paint adhesion after welding.

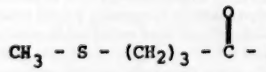
3,904,556

4-(METHYLTHIO)BUTANAL FRAGRANCE MODIFIER

Alan O. Pittet, Atlantic Highlands; John V. Pascale, Jackson, both of N.J.; Stuart Patton, State College, Pa., and Michael H. Brodnitz, Matawan, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 301,524, Oct. 27, 1972, Pat. No. 3,870,800. This application Mar. 1, 1974, Ser. No. 447,661
Int. Cl.² A61K 7/00; C11B 9/00
U.S. Cl. 252—522 1 Claim

1. A method for altering the fragrance properties of a perfume composition which comprises adding a fragrance effecting amount of a 4-(methylthio) butane derivative having the formula



3,904,557

METHOD FOR PRODUCTION OF A MULTICOLORED URETHANE SPONGE

James Leverette Guthrie, Ashton, and Lenore J. Huffman, Ellicott City, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 300,939, Oct. 26, 1972, abandoned. This application Feb. 26, 1974, Ser. No. 446,043
Int. Cl. C08g 22/48, 51/14, 51/66
U.S. Cl. 260—2.5 BD 1 Claim

1. A method for preparing a multicolored variegated polyurethane foam which comprises, preparing a prepolymer by capping polyoxyethylene polyol with polyisocyanate, the polyoxyethylene polyol having a weight average molecular weight of about 200 to about 20,000 and a hydroxyl functionality of about 2 to about 8, adding distinctively different colored compositions easily perceived by the unaided, naked eye to separate portions of the prepolymer or water, said colored compositions being water-soluble or dispersable in water or the prepolymer, mixing the separate colored portions of prepolymer or water with respective portions of water or prepolymer to form separate colored foaming masses, and mixing said foaming masses under laminar flow conditions to form a unitary product having substantially complete color separation, and recovering a multicolored variegated polyurethane foam.

3,904,558

PREPARATION OF LATEX FOAM RUBBERS AND FILMS

Everett Steadman Graham, and Ernest George Pole, both of Sarnia, Canada, assignors to Polysar Limited, Sarnia, Canada

Continuation-in-part of Ser. Nos. 372,502, June 22, 1973, abandoned, and Ser. No. 372,521, June 22, 1973, abandoned. This application May 31, 1974, Ser. No. 474,962
Int. Cl. C08f 47/08; C08c 17/08; C08d 13/08
U.S. Cl. 260—2.5 L 10 Claims

1. A process for preparing a sheet-like product from a heat gelling latex composition which comprises compounding a natural rubber latex or a latex of a rubbery homo- or copolymer of a C_4–C_{10} conjugated diene, said latices being stabilized with emulsifying agents which form water-insoluble compounds on reaction with zinc and cadmium ions, with (a) 0.2–30 parts of an amine sulfamate which hydrolyzes in water when the temperature is raised but which is characterized by little or no hydrolysis in water at ambient temperatures and being one in which the amine radical is derived from an amine which has a boiling point in the range of −35°C to +300°C, (b) 0.5–20 parts of a zinc or cadmium ion donor compound, (c) ammonia or an ammonia donor compound to provide 0.1–4.0 parts of ammonia, (d) 0-5 parts of an emulsifier which does not react with zinc and cadmium ions to form water-insoluble compounds and (e) a vulcanization system for the rubbery polymer, said parts being parts by weight per 100 parts by weight of rubbery polymer, adjusting the pH to a value of at least 8.0, foaming and shaping the latex composition into a sheet form and heating it to dry and vulcanize it.

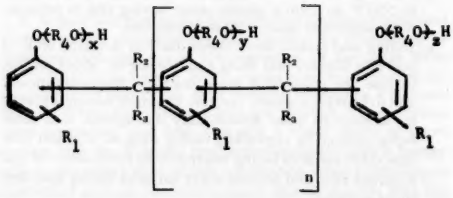
3,904,559

FOUNDRY AGGREGATE BINDERS

Ralph J. Furness, Tonawanda, and Frank W. Less, Kenmore, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Continuation-in-part of Ser. No. 236,230, March 20, 1972, abandoned. This application Nov. 19, 1973, Ser. No. 416,895
Int. Cl. B22c 1/22; C68g 5/20
U.S. Cl. 260—19 R 27 Claims

1. A foundry aggregate composition comprising (1) a foundry aggregate; (2) an organic polyisocyanate; (3) a substantially nonaqueous, organic solvent soluble component having the formula:



wherein

n has an average value of about 0.2 to 6;

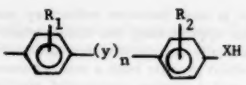
x, y and z are integers from 1 to 25;

R_1 is independently selected from the group consisting of hydrogen, fluorine, chlorine, bromine and hydrocarbon radical;

R_2 and R_3 are independently selected from the group consisting of hydrogen, an hydrocarbon radical; and a halogen-substituted hydrocarbon radical; and

R_4 is a hydrocarbon radical; and

(4) a phenolic compounds of the formula:



wherein X is oxygen or sulfur, Y is an alkylidene radical, an aryl bis-alkylene radical, an arylene radical, —S—, —S—S—, or

n is 0 or 1, and R_1 and R_2 are hydrogen, alkyl of 1 to 6 carbon atoms or halogen.

3,904,560
MARK-RESISTANT GLARE-FREE PAINT COMPOSITION

Eugene L. McKenzie, North St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 12, 1971, Ser. No. 188,449
Int. Cl.² C09D *3/64*
U.S. Cl. 260—22 A **3 Claims**

1. A paint composition for forming mark-resistant glare-free paint films comprising

A. a paint vehicle; and

B. a mixture of solid and hollow inert noncoalescing microspheres dispersed in the vehicle and adapted to uniformly and minutely roughen the surface of an applied film of the composition to reduce glare from the film; the average diameter of the hollow microspheres being the same as or less than the average diameter of the solid microspheres, and the volume ratio of solid to hollow microspheres lying between about 3:1 and 1:3.

3,904,561
PREPARATION OF POLYESTER RESINS WITH ENHANCED MOLDING PROPERTIES

Willem F. H. Borman, and Eugene P. Reilly, both of Pittsfield, Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 29, 1972, Ser. No. 310,537
Int. Cl. C08g *17/40, 39/02*
U.S. Cl. 260—22 R **10 Claims**

1. A process for the preparation of a high molecular weight, linear poly(alkylene terephthalate) resin having no substantial tendency to stick to the surface of a mold when cooled from the melt therein and having a highly glossy surface appearance free from discoloration after molding, said process comprising subjecting a bis ester of a glycol and a terephthalic acid to self-condensation with the removal of the glycol in the presence of a small, effective amount of fatty acid of the general formula

$$C_nH_{2n+1}COOH$$

wherein *n* is a whole number of from about 8 to about 30.

3,904,562
ORGANIC PIGMENTS ENCAPSULATED WITH VINYLPYRROLIDONE POLYMER

Harold B. Hopfenberg, Raleigh, N.C., and Thomas C. Rees, Park Forest South, Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Jan. 31, 1973, Ser. No. 328,201
Int. Cl.² C08K *9/04, 9/10;* **C08L** *91/00*
U.S. Cl. 260—22 CB **18 Claims**

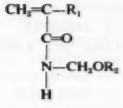
1. An encapsulated pigment material of substantially discrete particles which consist essentially of a solid core of colored azo organic pigment having an average particle size in the range of about 0.1 to 10 microns; and a substantially continuous outer layer consisting essentially of a transparent vinyl pyrrolidone polymer deposited on the core, the weight of polymer being about 5 to 100 parts per 100 parts of the core, the polymer being soluble in water and substantially insoluble in aromatic, aliphatic and alicyclic hydrocarbons, and the outer layer having a thickness of at least 10 A.

3,904,563
SYNTHETIC RESIN-ACRYLAMIDE DERIVATIVE CONDENSATION PRODUCT BASED POLYMERIZATION COMPOSITION

Kiyozo Shingai; Tadashi Watanabe; Koichiro Murata, and Osamu Isozaki, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., Amagasaki, Japan

Division of Ser. No. 187,817, Oct. 8, 1971, Pat. No. 3,799,910. This application Dec. 26, 1973, Ser. No. 427,664
Claims priority, application Japan, Oct. 12, 1970, 45-88793; Oct. 12, 1970, 45-88794
Int. Cl.² C09D *3/49, 3/66, 3/76*
U.S. Cl. 260—22 CB **9 Claims**

1. Polymerizable composition comprising (a) a condensation product of (1) at least one synthetic resin having at least two hydroxyl groups in the skeleton selected from the group consisting of polybutadiene glycol having a number average molecular weight of 600 to 5000 and having two hydroxyl groups at the molecular ends; acrylic resin having a number average molecular weight of 1000 to 100,000 and having a hydroxyl equivalent of 130 to 3000; alkyd resin having a number average molecular weight of 500 to 5000 and having a hydroxyl equivalent of 200 to 500; and unsaturated polyester resin having a number average molecular weight of 500 to 5000 and having a hydroxyl equivalent of 200 to 2000; and (2) 0.2 to 1.4 moles per mole of hydroxyl groups of a derivative of acrylamide of the formula



wherein R_1 is hydrogen or methyl and R_2 is hydrogen or alkyl of 1 to 8 carbon atoms, and (b) less than 300 parts by weight per 100 parts of said condensation product and at least 25 parts per 150 parts of said condensation product of an ethylenically unsaturated monomer.

3,904,564
PACKAGING STABILIZER

William E. Mayo, Lunenburg, Mass., and John W. Brook, Plainfield, N.J., assignors to M & T Chemicals Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 12,137, Feb. 17, 1970, abandoned. This application May 20, 1971, Ser. No. 145,467
Int. Cl.² C09K *15/00*
U.S. Cl. 260—23 XA **6 Claims**

1. A stabilizer composition for vinyl chloride polymers which comprises a solution of calcium ethyl acetoacetate in glycerol monoricinoleate, the weight ratio of calcium ethyl acetoacetate to glycerol monoricinoleate being between about 1:1 and 1:2.

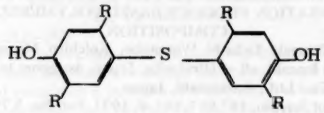
3,904,565

POLYOLEFIN COMPOSITION

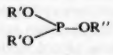
Hirohisa Yoshiura; Toshiharu Arai; Masao Miyake; Tsunemi Yoshioka; Tetsushi Kamizono, and Seiji Onogi, all of Kurashiki, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Nov. 29, 1973, Ser. No. 420,170
Claims priority, application Japan, Dec. 1, 1972, 47-120471
Int. Cl. C08f *19/14*
U.S. Cl. 260—23 H 8 Claims

1. A polyolefin composition containing a residual polymerization catalyst; from 0.001 – 1.0% by weight of a thiobisphenol having a formula



wherein R is the same or different and represents a hydrogen atom, an alkyl or cyclic hydrocarbon group; 0.01 – 2.0% by weight of an organic phosphite having a formula



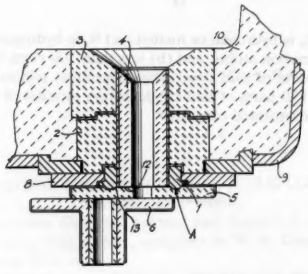
wherein R′ and R″ are the same or different and represent an alkyl group, a cycloalkyl group, an aryl group or aralkyl group; 0.01 –2.0% by weight of a metal salt of a higher fatty acid; and 0.01 – 0.5% by weight of a polyalkyleneglycol alkyl ether.

3,904,566

JOINTING COMPOSITIONS

Joseph William Cudby, Sheffield, England, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed July 19, 1973, Ser. No. 380,808
Claims priority, application United Kingdom, July 25, 1972, 34630/72; May 19, 1973, 24005/73
Int. Cl.[2] C09J *3/12;* C08L *15/00*
U.S. Cl. 260—23.7 M 9 Claims



1. A putty-like composition useful in forming seals between refractory pieces exposed to high temperature, said composition consisting by weight of about 2 to 12 percent of organic liquid carrier of the group consisting of benzene, toluene, xylene solvent naphtha, white spirit, carbon tetrachloride and mixtures thereof, about 9 to 35 percent of plasticizing binder consisting of a mixture of rubber and oil, and about 60 to 90 percent of a refractory powder of a particle size finer than 100 mesh BSS, said refractory powder being selected from the group consisting of fused alumina, sintered alumina, fused mullite, sintered mullite, calcined bauxite, sintered china clay and raw kayanite and mixtures thereof, said carrier and said binder having the characteristic that they burn away when the composition is used between refractory pieces exposed to temperatures approaching the temperature of liquid steel, leaving essentially compressed non-sintered layer of refractory fines which provide both a seal between the surfaces of the pieces and a parting compound enabling the surfaces subsequently to be separated.

3,904,567

METHOD OF TREATING SYNTHETIC POLYMER LATEX OF STYRENEBUTADIENE OR POLYISOPRENE TO MAKE SOLID POLYMER DERIVED THEREFROM REDISPERSIBLE TO A LATEX

Chin Peng Sung, Kuala Lumpur, Malaysia, assignor to The Board of the Rubber Research Institute of Malaysia, Malaysia

Filed Aug. 21, 1973, Ser. No. 390,246
Claims priority, application United Kingdom, Aug. 17, 1972, 38511/72
Int. Cl.[2] C08C *4/00;* C08L *5/00, 9/00, 91/00*
U.S. Cl. 260—23.7 R 10 Claims

1. A method of making a solid or pasty synthetic styrene-butadiene rubber which is dispersible in water, which method comprises adding at least 0.05% by weight of urea, as a re-dispersing agent, to a styrene-butadiene rubber latex and removing water from the latex.

3,904,568

METHOD FOR GRAFTING ORGANIC POLYMERS ONTO INORGANIC COLLOIDAL MATERIAL

Tadashi Yamaguchi, Sendai; Hiroshi Hoshi, Narashino; Michio Hirakawa, and Isao Watanabe, both of Ichikawa, all of Japan, assignors to Lion Yushi Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 23, 1973, Ser. No. 335,228
Claims priority, application Japan, Feb. 24, 1972, 47-19533
Int. Cl. C08f *45/04, 45/24*
U.S. Cl. 260—29.6 M 1 Claim

1. A method of grafting an organic polymer onto an inorganic material which comprises forming a suspension of a blast furnace slag and at least one polymerizable α,β-ethylenically unsaturated monomer in an aqueous medium; introducing into said suspension sulfurous acid or sulfur dioxide to form a colloid by mutual reaction with said blast furnace slag and initiate polymerization of said monomer, and retaining said silicate and monomer in said medium for a time sufficient for such monomer to undergo substantial polymerization.

3,904,569

METAL COATING COMPOSITIONS PREPARED FROM AQUEOUS DISPERSIONS OF CARBOXYLIC ACID RESIN AND AN ALIPHATIC POLYAMINE

Ihab M. Hekal, Downers Grove, and Raymond G. Chelton, Chicago, both of Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 301,022, Oct. 26, 1972. This application Sept. 10, 1973, Ser. No. 395,820
Int. Cl.[2] C03C *17/00;* B32B *15/08*
U.S. Cl. 260—29.6 N 11 Claims

1. A coating composition suitable for coating metal surfaces comprising an aqueous dispersion having dispersed therein a mixture of about 75 to 90% by weight of (1) a carboxylic acid containing olefin copolymer having reactive carboxyl groups prepared from about 60 to about 90 percent by weight of an α-olefin having the general formula $RCH{=}CH_2$ wherein R is selected from the group having 1 to 8 carbon atoms and about 10 to about 40 percent by weight of an α,β-ethylenically unsaturated carboxylic acid having 3 to 8 carbon atoms, and about 10 to 25 percent by weight of (2) an aliphatic polyamine selected from the group consisting of hexamethylene tetramine and amines of the general formula $NH_2(C_2H_4NH)_xC_2H_4NH_2$, x being an integer from 0 to 20, the amount of aliphatic polyamine in the mixture being sufficient to com-

pletely react with the reactive carboxyl groups of the carboxylic acid containing olefin copolymer.

3,904,570

FLAME-RETARDANT BINDER COMPRISING VINYLIDENE HALIDE-BIS(HYDROCARBYL) VINYL PHOSPHONATE POLYMER LATICES BLENDED WITH ANTIMONY OXIDE

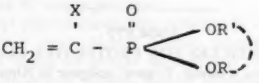
Jung Il Jin, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Sept. 19, 1973, Ser. No. 398,624

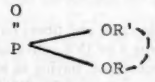
Int. Cl.[2] C08L *23/00*

U.S. Cl. 260—29.6 TA 12 Claims

1. A flame retardant polymer latex comprising: (1) from about 30% to 95% by weight of a polymer consisting essentially of from about 10% to 98% by weight of at least one halogen-containing α, β-ethylenically unsaturated vinyl monomer selected from the group consisting of the vinyl and vinylidene halides, the halogenated C_1–C_{12} alkyl acrylates and methacrylates, the halosubstituted nitriles of ethylenically unsaturated carboxylic acids, and the chlorinated styrenes; from about 1% to 89% by weight of at least one bis(hydrocarbyl)vinylphosphonate of the formula:



in which X is selected from the group consisting of hydrogen, halogen, cyano, phenyl, alkyl of from one to 18 carbon atoms and the grouping



wherein each R and R′ are hydrocarbyl of from one to 18 carbon atoms; and from about 1% to 45% by weight a C_1–C_{20} alkyl ester of acrylic and methacrylic acid; and (2) from about 5% to about 25% by weight of antimony oxide.

3,904,571

RESIN COMPOSITION OF PROMINENT ADHESIVITY

Shigenobu Ishihara, Tokyo, and Shoichi Kobayashi, Yokohama, both of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1974, Ser. No. 462,774

Claims priority, application Japan, Apr. 28, 1973, 48-47362; Apr. 28, 1973, 48-47363; May 8, 1973, 48-50260

Int. Cl.[2] C08K *5/09, 5/10*

U.S. Cl. 260—31.2 R 12 Claims

1. An adhesive resin composition comprising:

A. 1 to 99 parts by weight of ethylene-vinyl acetate copolymer containing 5 to 50% by weight of vinyl acetate,

B. 99 to 1 parts by weight of a mixture comprising 1 to 99 mol % of unsaturated dicarboxylic anhydride selected from the group consisting of maleic anhydride, itaconic anhydride, citraconic anhydride and α-methyl glutaconic anhydride and

99 to 1 mol % ester of carboxylic acid selected from the group consisting of acrylic and methacrylic acid esters of alkoxy monoalcohols, glycols, triols and tetraols; 2-methylene glutarate acid esters of alkanols or allyl alcohol; itaconic acid esters of alkanols or allyl alcohol; alkyl allyl esters of phthalic acid and diallyl phthalate.

3,904,572

COLD-SETTING COATING COMPOSITION BASED ON HYDROXY-CONTAINING VINYL POLYMER

Ching Yun Huang, Minoo; Naomitsu Takashina, Fujisawa; Senzo Shimizu, Chigasaki; Masahiro Shimoi, Hiratsuka; Masuya Ikegami, Chigasaki; Naoki Iwasaki, Hiratsuka; Rokuro Fujita, Chigasaki; Tadaaki Marushima, Hatano; Hisashi Katayama, and Mitsuhiko Masumoto, both of Yamakita, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Japan

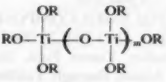
Filed Apr. 12, 1973, Ser. No. 350,479

Claims priority, application Japan, Apr. 20, 1972, 47-39130

Int. Cl. C08c *11/36;* C08f *15/62, 17/00*

U.S. Cl. 260—31.2 MR 12 Claims

1. A one-package type, cold-setting coating composition comprising (1) a copolymer of at least one α,β-ethylenically unsaturated monomer or conjugated diene monomer selected from the group consisting of ethylene, propylene, butadiene, isoprene, chloroprene, styrene, α-methylstyrene, dimethylstyrene, vinyltoluene, vinyl acetate, vinyl propionate, vinyl chloride, vinyl ether, vinylidene chloride, acrylonitrile, methacrylonitrile, alkyl acrylates and alkyl methacrylates and at least one α, β-ethylenically unsaturated hydroxy compound selected from the group consisting of hydroxyalkyl acrylates and methacrylates in which the alkyl group has 1 to 4 carbon atoms, 3-chloro-2-hydroxyalkyl acrylates and methacrylates in which the alkyl group has 3 to 4 carbon atoms, allyl alcohol, N-methylol acrylamide and N-methylol methacrylamide, (2) a crosslinking agent, and (3) an organic solvent, characterized in that the above crosslinking agent is a complex compound of (a) a titanate represented by the formula,



wherein R is an alkyl group having 1 to 20 carbon atoms or an alkenyl group having 2 to 20 carbon atoms; and *m* is zero or an integer of 1 to 20; with (b) at least one glycol and/or (c) at least one alkyl α-hydroxycarboxylate or a mixture of the (a) component with the (b) component and/or the (c) component, the amount of said complex being 0.1 to 5.0 moles per equivalent of the hydroxy group of the copolymer or the amount of the mixture being such that the (a) component is present in an amount of 0.1 to 5.0 moles per equivalent of the hydroxy group of the copolymer and the (b) and/or (c) component is present in an amount of from 0.5(m+1) to 2(m+2) moles wherein m has the same meaning as in the above-mentioned formula of the titanate per mole of the (a) component.

3,904,573

MODIFIED UREA RESINS

Gerd Klein, Troisdorf, and Kurt Schmoll, Hangelar, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Aug. 15, 1973, Ser. No. 388,683

Claims priority, application Germany, Aug. 18, 1972, 2240677

Int. Cl. C08c *11/44*

U.S. Cl. 260—31.8 T 7 Claims

1. A molded shaped article containing a hardened urea-formaldehyde condensation polymer, a filler, a lubricant, colorants or pigments said polymer having a urea-formaldehyde molar ratio from 1:1.2 to 1:1.8, and containing caprolactam.

3,904,574

THERMOSETTING COMPOSITIONS CONTAINING POLY(ARYLACETYLENES) AND AN AROMATIC RING COMPOUND HAVING THE RINGS JOINED THROUGH A NITROGEN

Lawrence C. Cessna, Jr., Wilmington, Del., assignor to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 316,332, Dec. 18, 1972. This application June 3, 1974, Ser. No. 476,124

Int. Cl.[2] C08F *138/02*

U.S. Cl. 260—32.6 R 8 Claims

1. A thermosetting composition comprising a blend of (1) prepolymer of at least one polyacetylenically substituted aromatic compound, said prepolymer having a number average molecular weight from about 900 to about 12,000, a ratio of aromatic protons to olefinic protons greater than about 2.4 and containing from about 5 to about 20% acetylenic groups by weight of the prepolymer, with (2) from about 2 to about 200%, by weight of the prepolymer, of at least one aromatic organic compound containing at least two six-membered aromatic rings, said rings being coupled with each other through a single nitrogen atom, said compound or mixtures thereof having a melting point less than about 220°C. and a boiling point greater than about 240°C.

3,904,575

FLUOROCARBON POLYMER COMPOSITION AND PRODUCTION AND USE THEREOF

Takaomi Satokawa, Osaka; Tuneo Fujii, Suita; Norimasa Honda, Settsu; Kozo Asano, Ibaragi; Yukiharu Nakamura, Ibaragi, and Seisuke Suzue, Takatsuki, all of Japan, assignors to Daikin Kogyo Co., Ltd., Japan

Continuation of Ser. No. 56,983, July 21, 1970, abandoned. This application May 31, 1973, Ser. No. 365,406

Claims priority, application Japan, July 21, 1969, 44-57522; July 21, 1969, 44-57523

Int. Cl.[2] C08K *5/07, 5/01;* C08L *27/20*

U.S. Cl. 260—32.8 R 24 Claims

1. A stable, substantially anhydrous organosol consisting essentially of about 5 to 40% by weight of particles of polytetrafluoroethylene and particles of tetrafluoroethylene-hexafluoropropylene copolymer dispersed in an organic solvent which is insoluble or hardly soluble in water, forms an azeotropic mixture with water and does not interfer chemically or physically with the polytetrafluoroethylene and the copolymer, the weight ratio of the polytetrafluoroethylene to the copolymer being from 5 : 95 to 50 : 60 and the particle size of said polytetrafluoroethylene and the copolymer being about 0.01 to 3 microns.

3,904,576

BLEND OF TWO CHLOROPRENE POLYMERS

Sidney George Fogg, Ashstead, and David John Walker, Epsom, both of England, assignors to BP Chemicals International Limited, London, England

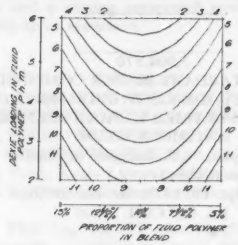
Filed May 14, 1974, Ser. No. 469,803

Claims priority, application United Kingdom, May 17, 1973, 23532/73; July 26, 1973, 35615/73

Int. Cl.[2] C08K *5/02;* C08L *47/00*

U.S. Cl. 260—33.8 UA 12 Claims

1. A chloroprene polymer blend which comprises from 95 to 85% by weight of a first benzene-soluble chloroprene polymer having a Mooney Viscosity ML1+4′ at 100°C in the range 40 to 100 and 5 to 15% by weight of a second, fluid, benzene-



soluble chloroprene polymer formed by the polymerization of chloroprene in the presence of a quantity of xanthogen modifier having the formula

$$R_1—O—\overset{\overset{S}{\|}}{C}—S—(S)_n—S—\overset{\overset{S}{\|}}{C}—O—R_2$$

wherein R_1 and R_2 are alkyl groups containing from 1 to 8 carbon atoms and n is an integer or zero sufficient to produce a fluid polymer.

3,904,577

TEXTILE ARTICLES FOR PROTECTIVE CLOTHING

Francois Buisson, Colmar, France, assignor to Rhone-Poulenc-Textile, Paris, France

Filed July 31, 1972, Ser. No. 276,748

Claims priority, application France, Aug. 12, 1971, 71.29800

Int. Cl. C08g *51/04*

U.S. Cl. 260—37 N 2 Claims

1. Noninflammable yarns and fibers having a base of polyamide-imide comprising 8 to 35% activated carbon, referred to the quantity of dry substance, having an iodine number of 100 to 500 and a specific surface of 90–300 m^2/g.

3,904,578

STABILIZED POLYESTER COMPOSITION AND METHOD FOR STABILIZING POLYESTER

Shoji Kawase; Hiroo Inata, and Takeo Shima, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

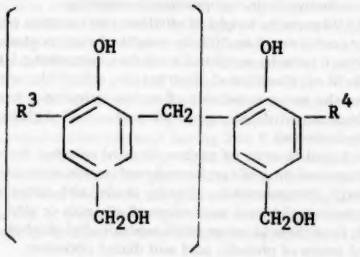
Filed Nov. 21, 1973, Ser. No. 417,918

Claims priority, application Japan, Nov. 24, 1972, 47-117095

Int. Cl. C08g *51/58*

U.S. Cl. 260—40 P 6 Claims

1. A stabilized polyester composition comprising a polyester at least 80 % of the recurring units of which in terms of number, consist of tetramethylene terephthalate units of tetramethylene 2,6-naphthalate units, and 0.001 to 10 % by weight, based on the weight of said polyester, of at least one compound selected from the group consisting of compounds of the formula



wherein R^3 and R^4 are the same or different and each represent an alkyl group, and *n* is an integer of 1 or 2.

3,904,579

NOVEL FLOOR-TILE COMPOSITIONS COMPRISING PLASTICIZED VINYL CHLORIDE POLYMERS

Robert P. Braddicks, Mt. Vernon, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 399,931, Sept. 24, 1973, abandoned, which is a continuation-in-part of Ser. No. 276,908, Aug. 1, 1972, abandoned. This application Aug. 14, 1974, Ser. No. 497,254

Int. Cl. C08f *45/42, 45/40*

U.S. Cl. 260—42.46 **73 Claims**

1. A plasticized solid composition comprising a plasticizer containing a homogeneous mixture of:

a. normally solid thermoplastic polymeric binder selected from the group consisting of:

i. vinyl chloride/vinyl C_2–C_4 alkanoate polymer in which the polymerized vinyl chloride portion thereof comprises at least about 70 weight percent and the polymerized vinyl C_2–C_4 alkanoate portion thereof comprises up to about 30 weight percent

ii. vinylidene chloride/vinyl chloride polymer in which the polymerized vinyl chloride portion thereof comprises at least about 50 weight percent and the polymerized vinlylidene chloride portion thereof comprises up to about 50 weight percent

iii. vinyl chloride/propylene polymer in which the polymerized vinyl chloride portion thereof comprises at least about 90 weight percent and the polymerized polypropylene portion thereof comprises from about 10 to about 4 percent by weight

iv. chlorinated polyethylene polymer having not greater than 5 percent crystallinity; a molten viscosity of from about 10,000 to 30,000 poises at 190°C and a chlorine content of at least 40 percent by weight

v. vinyl chloride/vinyl C_2–C_4 alkanoate/C_2–C_4 alkene random terpolymer having an inherent viscosity less than about 0.5 in which the polymerized vinyl chloride portion thereof comprises the major proportion by weight

vi. mixtures of said polymers

b. normally-solid thermoplastic vinyl chloride/vinyl C_2–C_4 alkanoate/C_2–C_4 alkene relatively high molecular weight random terpolymer having an inherent viscosity of from about 0.5 to about 0.9 in which the polymerized vinyl chloride portion thereof comprises the major portion by weight; and

c. a filler;

wherein the total combined weight of said polymeric binder and said relatively high molecular weight terpolymer is comprised of from about 25 to about 65 weight percent polymeric binder and from about 75 to about 35 weight percent of said terpolymer; and wherein said filler is present in amounts ranging from about 200 to about 750 parts by weight per 100 parts by weight of said polymeric binder and said relatively high molecular weight terpolymer.

3,904,580

AMINE MODIFIED REMOLDABLE RUBBERS

Evalds Lasis; Ernest Jack Buckler, and John Robert Dunn, all of Sarnia, Ontario, Canada, assignors to Polysar Limited, Sarnia, Canada

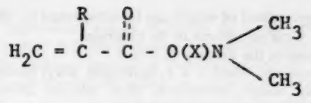
Filed Sept. 26, 1974, Ser. No. 509,642

Claims priority, application Canada, Nov. 8, 1973, 185313

Int. Cl. C08c *11/18, 11/24;* **C08d** *3/02*

U.S. Cl. 260—42.47 **11 Claims**

1. A composition of matter having rubbery and thermoplastic properties, said composition comprising the reaction product of (A) a rubbery copolymer of a C_4 – C_6 conjugated diolefin and an acrylate or methacrylate of general formula



where R represents H or CH_3 and X represents an aliphatic hydrocarbon group of 2–4 carbon atoms or a secondary or tertiary amine substituted hydrocarbon group of 2–4 carbon atoms, the copolymer containing from about 2 to about 5 weight per cent of polymerized acrylate or methacrylate, and (B) a halogen containing organo compound containing 2 or more halogen atoms capable of reacting with the tertiary amine groups of the polymerized acrylate or methacrylate, the amount of halogen compound being such as to provide from about 0.25 moles to about 5 moles of halogen groups per mole of tertiary amine groups in the copolymers.

3,904,581

STABILIZATION OF SYNTHETIC POLYMERS

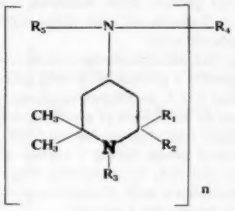
Keisuke Murayama; Syoji Morimura; Katsuaki Matsui; Tomoyuki Kurumada; Noriyuki Ohta, and Ichiro Watanabe, all of Tokyo, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Sept. 21, 1973, Ser. No. 399,611

Int. Cl.² C08K *5/34*

U.S. Cl. 260—45.8 N **12 Claims**

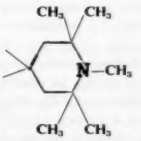
1. A synthetic polymer composition stabilized against photo- and thermal deterioration wherein there is incorporated from 0.01 to 5.0 percent by weight, based on the weight of the synthetic polymer, of a compound having the formula (I)



(I)

wherein

R_1 and R_2 each represent methyl or R_1 and R_2 together with the carbon atom to which they are linked represent a group having the formula



R_3 represents alkyl having 1 to 8 carbon atoms; substituted alkyl having 1 to 3 carbon atoms in the alkyl moiety and which is selected from the group consisting of hydroxyalkyl, alkoxyalkyl having 1 or 2 carbon atoms in its alkoxy moiety, phenoxyalkyl, aliphatic acyloxyalkyl having 2 to 18 carbon atoms in the acyl moiety, aromatic acyloxyalkyl having 7 to 11 carbon atoms in the acyl moiety, halogenoalkyl, cyanoalkyl, epoxyalkyl, aminoalkyl substituted by alkyl having 1 to 4 carbon atoms, alkoxycarbonylalkyl having 1 to 4 carbon atoms in the alkoxy moiety and phenoxycarbonyl-alkyl; alkenyl having 3 or 4 carbon atoms; alkynyl having 3 or 4 carbon atoms or benzyl the

phenyl radical of which can be substituted by alkyl having 1 to 4 carbon atoms or by chlorine,

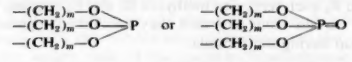
n represents the integer 1, 2 or 3,

R_4 represents, when n is 1, hydrogen, alkyl having 1 to 18 carbon atoms; substituted alkyl, alkenyl, alkynyl or unsubstituted or substituted benzyl as defined under R_3; 3,5-di-tert-butyl-4-hydroxybenzyl; cycloalkyl having 5 or 6 carbon atoms; aryl having 6 to 10 carbon atoms in the aryl and which may be substituted on said aryl by alkyl or alkoxy having 1 to 4 carbon atoms; aliphatic monoacyl having 2 to 18 carbon atoms; cycloaliphatic monoacyl having 6 or 7 carbon atoms; aromatic monoacyl having 6 to 10 carbon atoms in the aryl moiety and which can be substituted on said aryl by alkyl having 1 to 4 carbon atoms, chlorine, hydroxyl or methoxy; heterocyclic monoacyl containing O- or N-atoms; alkoxycarbonyl having 1 to 8 carbon atoms in the alkoxy moiety and which can be substituted by hydroxyl; benzyloxycarbonyl; carbamoyl and thiocarbamoyl which are unsubstituted or substituted on the N-atom by alkyl having 1 to 4 carbon atoms cyclohexyl, phenyl, chlorophenyl, naphthyl or benzyl; a monovalent group which is derived, by removing a hydroxyl group, from methanesulfenic acid, benzenesulfenic acid, benzenesulfinic acid, methanesulfonic acid, benzenesulfonic acid, p-toluenesulfonic acid or diphenyl-phosphorus acid, or, R_4 and R_5, together with the nitrogen atom to which they are linked, represent a phthalimido group;

R_4 represents, when n is 2, alkylene having 2 to 6 carbon atoms, alkenylene having 4 to 6 carbon atoms, aralkylene having 8 to 10 carbon atoms, p,p′-methanediphenylene, carbonyl, aliphatic diacyl having 2 to 18 carbon atoms, aromatic diacyl having 8 carbon atoms; N-substituted dicarbamoyl or N-substituted bis-thiocarbamoyl which are substituted by alkylene having 2 to 6 carbon atoms, arylene having 6 to 8 carbon atoms or p,p′-methanediphenylene; a divalent group derived, by removing two hydroxyl groups, from sulfurous acid, sulfuric acid, benzene-1, 3-disulfonic acid, phenylsulfurous acid or phenylphosphoric acid;

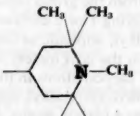
or, R_4 and R_5, together with the nitrogen atom to which they are linked, represent a pyromellitdiimido group;

R_4 represents, when n is 3, an alkanetriyl group having 5 or 6 carbon atoms; an aralkanetriyl group having 9 carbon atoms; an aliphatic triacyl group having 6 carbon atoms; an aromatic triacyl group having 9 carbon atoms, or a trivalent group derived, by removing three hydroxyl groups, from phosphoric acid, phosphorous acid or boric acid, or a group having the formulae



wherein m represents an integer from 1 to 4; and

R_5 represents hydrogen; a substituted alkyl group, an alkenyl or alkynyl group, or an unsubstituted or substituted benzyl group as defined under R_3; an unsubstituted alkyl group, a cycloalkyl group, an unsubstituted or substituted aryl group as defined under R_4; an alkoxycarbonylalkenyl group having 1 to 4 carbon atoms in the alkoxy moiety and 2 or 3 carbon atoms in the alkenyl moiety; a 2-thiazolyl-, 2-pyridyl- or 2-pyrimidyl group or a group having the formula



or, when R_4 represents an alkylene, alkenylene, aralkylene, alkanetriyl or aralkanetriyl group, R_5 represents an acyl or alkoxycarbonyl group as defined under R_4, an unsubstituted or N-substituted carbamoyl or thiocarbamoyl group as defined under R_4 or a monovalent group as defined under R_4.

3,904,582

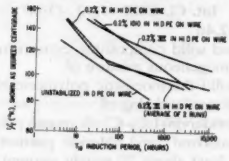
ANTIOXIDANTS FOR POLYOLEFINS

Ralph Holm Hansen, Short Hills, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

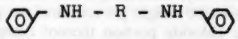
Filed July 30, 1974, Ser. No. 493,100

Int. Cl.[2] C08K *5/16*

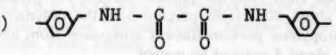
U.S. Cl. 260—45.8 N **7 Claims**

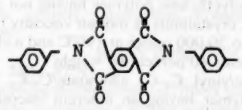


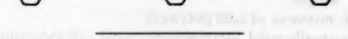
1. Composition of matter comprising polyolefins stabilized against oxidative degradation with an antioxidant having the general formula:



wherein —R— is selected from the group consisting of

A) 

B) 

C) 

3,904,583

PREPARATION OF ORGANOSILICON POLYMERS

John Allen Saunders, Reigate, and Barrie Searle Cox, Teddington, both of England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 333,538, Feb. 20, 1973, abandoned. This application Apr. 26, 1974, Ser. No. 464,338

Int. Cl.[2] C08G *77/06*

U.S. Cl. 260—46.5 R **24 Claims**

1. A process for the production of an organic solvent soluble organosilicon polymer which comprises reacting wollastonite with an organosilyl capping agent in the presence of an acid in an amount sufficient to react with at least half the replaceable metal cations of the wollastonite, a water miscible organic solvent and water in an amount such that the concentration of the acid in the aqueous phase is not greater than two gram equivalents per litre, so that silylation of the wollastonite takes place with at least partial retention of the silicate backbone.

3,904,584

CROSSLINKED POLYQUINOXALINE POLYMERS

Robert J. Jones, Hermosa Beach, and Michael K. O'Rell, Manhattan Beach, both of Calif., assignors to TRW Inc., Redondo Beach, Calif.

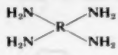
Filed Oct. 31, 1973, Ser. No. 411,511

Int. Cl. C08g *9/04, 9/06, 15/00*

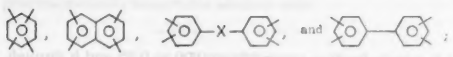
U.S. Cl. 260—47 UA **2 Claims**

1. A method for making crosslinked polyquinoxalines comprising:

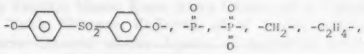
A. reacting (i) an aromatic tetraamine having the structure



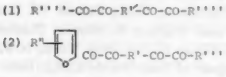
wherein R is a tetrafunctional radical selected from the group consisting of



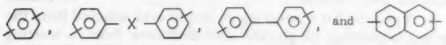
where X is selected from the group consisting of —O—, —CO—, —S—, $-SO_2-$,



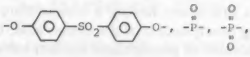
$-CH_2-$, $-C_2H_4-$, and $-C_3H_6-$; with (ii) an aromatic bisglyoxal selected from the group consisting of



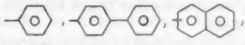
where R; is a difunctional aromatic radical selected from the group consisting of



where X is selected from the group consisting of —O—, —S—, —CO—, $-SO_2-$,



$-CH_2-$, $-C_2H_4-$, and $-C_3H_6-$; R'' is an optional monofunctional radical selected from the group consisting of hydrogen radical and alkyl radical having 1 to 4 carbon atoms; R''' is a monofunctional radical selected from the group consisting of —H,



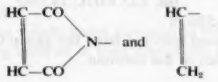
and

and R'''' is a monofunctional radical selected from the group consisting of —H and

where the amount of (1) ranges from 0.00 to 0.95 and (2) ranges from 0.05 to 1.00 mole fraction of the bisglyoxal, the total mole fraction of the aggregate amounting to unity; and (iii) one equivalent weight of an olefinic endcapped compound having the structure:

Z-R'-Z

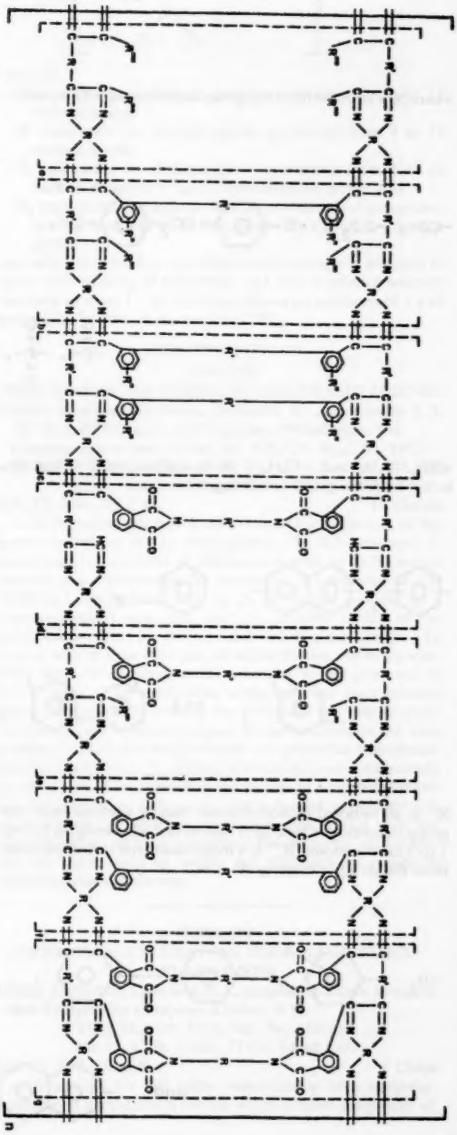
where Z is selected from the group consisting of



for each equivalent weight of furan monomer whereby a polyquinoxaline is formed having a crosslink chain attached by alicyclic endooxy linkage at quinoxaline linkage sites;

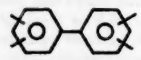
B. heating the polyquinoxaline in a temperature range from 200°C to 300°C to aromatize the alicyclic endooxy linkage.

2. A crosslinked polyquinoxaline consisting essentially of the structure:

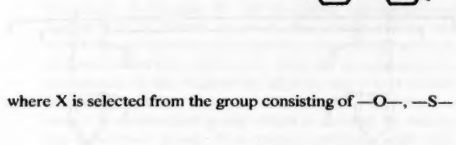


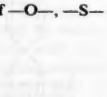
wherein R is a tetrafunctional radical selected from the group consisting of

and

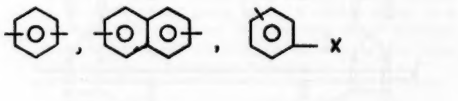


where X is selected from the group consisting of —O—, —S—

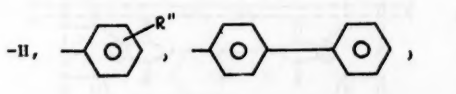




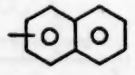
$-CH_2-$, $-C_2H_4-$ and $—C_3H_6—$' R' is a difunctional radical selected from the group consisting of



R'' is an optional monofunctional radical selected from the group consisting of hydrogen radical and alkyl radicals having 1 to 4 carbon atoms; R''' is a monofunctional radical selected from the group consisting of



and



and R'''' is a monofunctional radical selected from the group consisting of —H and

a is a mole fraction ranging from 0.00 to 0.95 and b through g, respectively is a mole fraction ranging from 0.05 to 1.00 wherein the sum of the mole fractions is equal to unity; and n is an integer between 2 and 200.

3,904,585

PROCESS FOR RECOVERING GLYCINE AND BETA-ALANINE FROM SODIUM SULFATE SOLUTIONS

Jon C. Thunberg, Amherst, N.H.; Robert W. Bragdon, Marblehead, Mass., and William P. Moore, Hudson, N.H., assignors to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 442,543, Feb. 14, 1974, abandoned, Continuation-in-part of Ser. No. 319,539, Dec. 29, 1972, Pat. No. 3,808,269. This application Oct. 24, 1974, Ser. No. 517,469

Int. Cl.[2] C07C *51/42*

U.S. Cl. 260—534 R **15 Claims**

1. A process for recovering an amino acid selected from the group consisting of glycine and β-alanine from a starting aqueous solution consisting essentially of sodium sulfate, the amino acid, and water, the starting aqueous solution having a temperature above 33°C, a pH of 4.5–8.5, a mole ratio of amino acid to sodium sulfate of 1–5:1 and containing at least 5% of the amino acid, said process comprising:

a. forming a first slurry having a temperature effective for preventing precipitation of the amino acid, the first slurry being a mixture of precipitated sodium sulfate and a first mother liquor, the first mother liquor being a second aqueous solution consisting essentially of sodium sulfate, the amino acid, and water, by evaporating water from the starting aqueous solution while maintaining its temperature within a range effective for preventing the precipitation of the amino acid;

b. separating the first mother liquor from the precipitated sodium sulfate;

c. cooling the separated first mother liquor to a temperature within a range effective for precipitating the amino acid to form a second slurry, the second slurry being a mixture of precipitated glycine or β-alanine and a second mother liquor, the second mother liquor being a third aqueous solution consisting essentially of sodium sulfate, and amino acid, and water; and

d. separating and recovering the precipitated amino acid.

3,904,586

NOVEL BENZYLOXYSULFAMIDES

Pierre Henri Derible, Le Perreux; Daniel Humbert, Paris, and Claude Dumont, Nogent-sur-Marne, all of France, assignors to Roussel-UCLAF, Paris, France

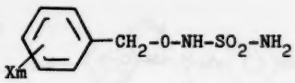
Filed July 10, 1974, Ser. No. 487,036

Claims priority, application France, July 13, 1973, 73.25759

Int. Cl.[2] C07C *143/80*

U.S. Cl. 260—556 N **12 Claims**

1. A compound selected from the group consisting of benzyloxysulfamides of the formula



wherein X is a halogen and m is 0, 1, 2 or 3 and their nontoxic, pharmaceutically acceptable alkaline salts.

3,904,587

PROCESS FOR THE PRODUCTION OF POLYMERS CAPABLE OF SELF-CURING AT ROOM TEMPERATURE AND PRODUCTS THEREOF

Yoshio Tanaka; Masao Kato; Akira Okada, all of Yokohama, and Yukio Shimura, Fujisawa, all of Japan, assignors to Director-General of the Agency of Industrial Science & Technology, Tokyo, Japan

Filed Oct. 26, 1972, Ser. No. 301,077
Claims priority, application Japan, Oct. 27, 1971, 46-85342
Int. Cl. C08g *22/04*; C08f *1/08*, *17/00*
U.S. Cl. 260—77.5 BB 4 Claims

1. A process for the production of polymers capable of self-curing at room temperature, characterized by subjecting to free radical polymerization in a non-protonic solvent a monomeric material consisting essentially of at least one ethylenically unsaturated monomer having at least one epoxy group and a tertiary amino group selected from the group consisting of an N,N-disubstituted amino group, a pyridyl group, a quinolyl group and an isoquinolyl group.

3,904,588

RANDOM ETHYLENE/ALKYL ACRYLATE 1,4-BUTENE-IOIC ACID TERPOLYMERS

Robin N. Greene, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 9, 1973, Ser. No. 387,028
Int. Cl.[2] C08F *8/32*, *220/18*
U.S. Cl. 260—78.5 R 6 Claims

1. A random copolymer made by continuously feeding monomers and initiator to a stirred reaction zone and continuously withdrawing a reaction mixture containing the copolymer from the reaction zone, which copolymer when it contains 50 parts of fast extruding carbon black per 100 parts of copolymer and is cured with 1.5 parts of hexamethylene diamine carbamate per 100 parts of copolymer for 30 minutes at 180°C and 40,000 lbs. pressure has a brittle point of less than about −40°C, an oil swell of less than about 120%, a Shore A hardness at 25°C of less than 69, an elongation at break of greater than 260%, and a 100% modulus of less than 940 psi, comprising polymerized ethylene, alkyl acrylate selected from methyl and ethyl acrylate, and from about 0.5 to 10 weight percent of a mono alkyl ester of 1,4-butene-dioic acid in which the alkyl group of the ester has 1 to 6 carbon atoms, said copolymer having from about 20 to 35 grams of (—CO_2—) units per 100 grams of copolymer, said copolymer having a melt index of about 0.3 to 100 g/10 min.

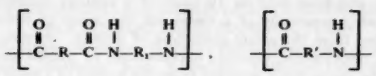
3,904,589

POLYAMIDES WITH FREE SECONDARY AMINO GROUPS

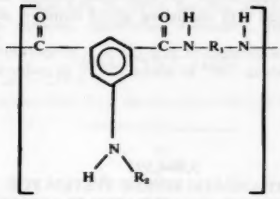
Eduard Radlmann, Dormagen-Hackenbroich; Jurgen Schramm, and Gunther Nischk, both of Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Sept. 3, 1974, Ser. No. 502,890
Claims priority, application Germany, Sept. 12, 1973, 2345876
Int. Cl. C08g *20/10*
U.S. Cl. 260—78 A 4 Claims

1. High molecular weight linear polyamides which comprise structural repeating units of at least one of the following formulae



and



wherein

R represents an alkylene group containing from 4 to 12 carbon atoms;

R′ represents an alkylene group containing from 4 to 12 carbon atoms

R_1 represents an alkylene group containing from 4 to 12 carbon atoms or a C_6–C_8 cycloalkylene group; and

R_2 represents a straight or branched-chain alkyl group containing from 1 to 10 carbon atoms or a C_6 to C_8 cycloalkyl group;

and which contain free secondary amino groups in amounts of up to 500 mval/kg of polyamide and have a relative solution viscosity of from 1.1 to 3.5 (determined on solutions of 1 g of polyamide in 100 ml m-cresol at 25°C).

3,904,590

PROCESS FOR POLYMERIZING CHLOROBUTADIENES

Anestis Leonidas Logothetis, Louisville, Ky., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 399,329, Sept. 20, 1973, abandoned. This application May 20, 1974, Ser. No. 471,809
Int. Cl.[2] C08F *28/00*, *136/16*; C08G *75/00*
U.S. Cl. 260—79.3 R 11 Claims

1. In a process wherein a chlorobutadiene monomer of the group consisting of (a) chloroprene, (b) 2,3-dichloro-1,3-butadiene, (c) mixtures of chloroprene with up to 50 weight percent of a copolymerizable monomer, (d) mixtures of 2,3-dichloro-1,3-butadiene with up to 50 weight percent of a copolymerizable monomer, and (e) mixtures of any of the above monomers (a), (b), (c) and (d), is copolymerized by mixing with at least 0.01 part of sulfur dioxide, up to its solubility limit, in aqueous, acidic emulsion in the presence of 0.3–4 parts of an acid-stable surfactant, the improvement which comprises controlling the initiation and rate of polymerization by (1) having present in the emulsion at the time of mixing with sulfur dioxide 0.001–1.0 part of an iron-chelating compound, and (2) adding incrementally or continuously quantities of a water-soluble iron (II) salt as needed to initiate the polymerization and sustain it at a desired, controlled rate up to about 1% monomer conversion per minute until the polymerization reaches a predetermined degree of completion; all parts being by weight per 100 parts by weight of chlorobutadiene monomer.

3,904,591

PRIMARY ACCELERATORS FOR SULFUR-CURED ELASTOMERS

Wilbur F. Fischer, Cranford, N.J., assignor to Exxon Research and Engineering Company, Linden, N.J.

Filed May 20, 1971, Ser. No. 145,291
Int. Cl. C08c *11/64*, *11/04*; C08d *9/00*
U.S. Cl. 260—79.5 B 1 Claim

1. A process for the sulfur vulcanization of a nonpolar, unsaturated hydrocarbon rubber which consists essentially of:

a. adding to 100 parts of said rubber a vulcanizable amount of sulfur and from 0.25 to 10 parts of a primary accelerator consisting essentially of a metal salt the anion of which is selected from the group consisting of acetate, chloride, nitrate, thiocyanate, octoate, naphthenate, or neodecanoate, and the metal being selected from the metals of Group I-A, Group II-A, or transition metals wherein said salt has a lattice energy of less than about 700 kcal/mole; wherein the metal salt is complexed with diethylene glycol dimethyl ether (diglyme); and

b. heating the product of step (a) to a temperature in the range of about 300° to about 550°F. in order to effect cure.

3,904,592

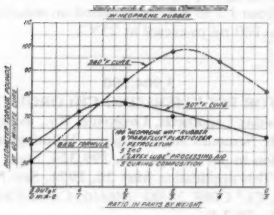
URETHANE-MALEIMIDE SYSTEM FOR CROSS-LINKING UNSATURATED ELASTOMERS

Frederick H. Sexsmith, 5548 Bondy Dr., Erie, Pa. 16509, and Nicholas J. Gervase, 1316 W. 37th St., Erie, Pa. 16508

Filed Nov. 13, 1972, Ser. No. 305,989

Int. Cl.² C08C *11/40, 9/00;* **C08D** *9/00*

U.S. Cl. 260—83.3 **37 Claims**



1. A composition for curing diene-containing rubber which comprises a synergistic combination consisting essentially of at least one urethane cross-linking agent capable of cross-linking diene-containing rubber, and at least one maleimide cross-linking agent capable of cross-linking diene-containing rubber, the relative proportions of said maleimide cross-linking agent to said urethane cross-linking agent being in the range from about 4:1 to about 0.5:5 parts by weight, said urethane cross-linking agent being derived from a polyisocyanate and an aromatic nitroso compound the quinonoid configuration of which is unsubstituted or substituted with substituents which do not interfere with the reactivity of the nitroso group with rubber.

3,904,593

PEPTIDE DERIVATIVES HAVING AN α-HYDRAZIDE LINKAGE AND PREPARATION THEREOF

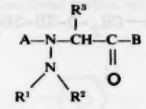
Hans U. Immer, Montreal; Verner R. Nelson, Kirkland, and Manfred K. Götz, Hudson, all of Canada, assignors to American Home Products Corporation, New York, N.Y.

Filed Feb. 7, 1973, Ser. No. 330,352

Int. Cl.² C07C *103/52;* **A61K** *37/00*

U.S. Cl. 260—112.5 **13 Claims**

1. A compound of formula 1



1

in which R^1 and R^2 each are lower alkyl, R^3 is an amino acid side chain, A is the acyl component of an amino acid or peptide and B is the amino component of a second amino acid or peptide having up to four amino acid units.

3,904,594

SOMATOSTATIN AND ACYLATED Des-(Ala¹, GLY²) DERIVATIVES THEREOF

Roger C. L. Guillemin, La Jolla; Paul E. Brazeau, Jr., Solana Beach; Roger C. Burgus, Leucadia; Nicholas C. Ling, San Diego; Jean E. F. Rivier, and Wylie W. Vale, Jr., both of La Jolla, all of Calif., assignors to The Salk Institute for Biological Studies, San Diego, Calif.

Continuation-in-part of Ser. No. 375,334, June 2, 1973, abandoned. This application June 12, 1974, Ser. No. 478,175

Int. Cl.² C07C *103/52;* **A61K** *37/00*

U.S. Cl. 260—112.5 **20 Claims**

1. A compound which is capable of inhibiting the secretion of growth hormone in mammalians, said compound being a peptide selected from the group consisting of

R-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr-Phe-Thr-Ser-Cys-OH, and R-Cys-Lys-Asn-Phe-Phe-Trp-Lys-Thr-Phe-Thr-Ser-Cys-OH, where R is an acylating agent selected from the group consisting of amino acids, dipeptides, tripeptides and aliphatic, aromatic and cyclic organic acids having from 1 to 10 carbon atoms or hydrogen.

3,904,595

LUBRICATING OIL DISPERSANT

Larry Plonsker, Bloomfield Hills, and Robert E. Malec, Birmingham, both of Mich., assignors to Ethyl Corporation, Richmond, Va.

Filed Sept. 14, 1973, Ser. No. 397,414

Int. Cl.² C07G *17/00*

U.S. Cl. 260—132 **11 Claims**

1. A product made by the process comprising heating to a temperature of about 50°–300°C. a mixture of (1) from about 1–20 parts by weight of elemental sulfur and (2) about 100 parts by weight of a condensation product made by reacting about (a) one mole part of a high molecular weight alkylphenol wherein said alkyl has a molecular weight of from about 600–3000, (b) about 0.1–10 mole parts of an amine selected from the group consisting of (i) aliphatic amine containing from 1 to about 20 carbon atoms and having at least one >NH group, (ii) piperidine and (iii) morpholine, and (c) about 0.1–10 mole parts of an aliphatic aldehyde containing from 1 to about 6 carbon atoms.

3,904,596

BROWN DISPERSE 4-CARBOXAMIDO-4'-PHENYLAZOAZOBENZENE DYES

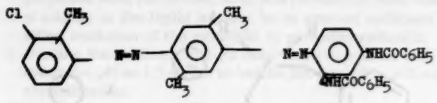
John Blackwell, Kennett Square, Pa., and Richard Edwin Peavy, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 25, 1972, Ser. No. 275,038

Int. Cl.² C09B *31/04*

U.S. Cl. 260—187 **2 Claims**

1. Dye of the formula



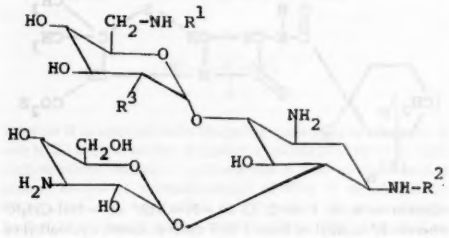
3,904,597

ANTIBIOTIC DERIVATIVES

Takayuki Naito; Susumu Nakagawa, and Yoshio Abe, all of Tokyo, Japan, assignors to Bristol-Myers Company, New York, N.Y.

Filed Feb. 23, 1973, Ser. No. 335,211
Int. Cl.[2] C07G *11/00*
U.S. Cl. 260—210 K 7 Claims

1. A compound having the formula



in which R^1 is H, R^2 is L-(−)-β-amino-α-hydroxypropionyl and R^3 is OH or NH_2, or a nontoxic pharmaceutically acceptable salt thereof.

3,904,598

PROCESS FOR THE RECOVERY OF HELLEBRIN

Otto Isaac, Bruchkobel, Germany, assignor to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed July 27, 1971, Ser. No. 166,596
Claims priority, application Germany, July 31, 1970, 2038110
Int. Cl.[2] C07J *19/00*
U.S. Cl. 260—210.5 16 Claims

1. In a process for the recovery of hellebrin by adsorptive purification of a hellebrin containing extract on silica gel the improvement comprising using silica gel with a particle size of 0.15–10 mm.

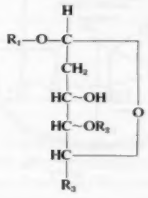
3,904,599

CARDENOLIDE-3-[2′-DESOXY-GLYCOSIDES] AND PROCESS FOR THEIR MANUFACTURE

Ulrich Stache, Hofheim; Werner Fritsch, Neuenhain; Werner Haede, Hofheim; Kurt Radscheit, Keikheim, and Ernst Lindner, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 26, 1973, Ser. No. 382,639
Claims priority, application Germany, July 29, 1972, 2237377
Int. Cl.[2] C07C *173/00*
U.S. Cl. 260—210.5 7 Claims

1. A cardenolide-3-[2′-desoxy-glycoside] of the formula



wherein R_1 is a steroid of the 3-hydroxy-cardenolide series, R_2 is hydrogen, benzoyl, or alkanoyl having 1 to 4 carbon atoms, and R_3 is hydrogen, methyl, or $—CH_2OR_2$.

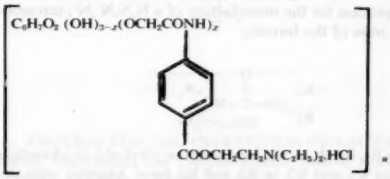
3,904,600

HIGH-MOLECULAR DERIVATIVE OF 2-DIETHYLAMINOETHYL-PARA-AMINOBENZOATE HYDROCHLORIDE AND METHOD FOR PREPARING IT

Milda Yanovna Pormale, ulitsa Suvorova, 104, kv. 10; Nadezhda Alexandrovna Kashkina, ulitsa Talsu, 9/11, kv. 22; Ieva Petrovna Leiman, ulitsa Stokkholmas, 17, kv. 1; Arvid Yanovich Kalninsh, ulitsa Sverdlova, 8, kv. 3; Yan Shuster, ulitsa Kveles, 15, korpus 4, kv. 30, all of Riga, and Valdis Danielovich Mikazhan, Stopinsky selsovet, Tuberkuleznaya bolnitsa, korpus 1, Rizhsky raion, all of U.S.S.R.

Filed Mar. 20, 1974, Ser. No. 453,669
Int. Cl. C08b *11/00*
U.S. Cl. 260—231 A 3 Claims

1. A high-molecular weight derivative of 2-diethylaminoethyl-p-aminobenzoate hydrochloride having the general formula



where x is the degree of substitution from 0.6 to 1.00, and n is the degree of polymerization from 40 to 120.

3,904,601

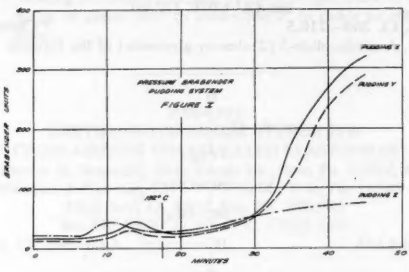
HYDROXYPROPYLATED, INHIBITED HIGH AMYLOSE RETORT STARCHES

Martin M. Tessler, Edison; Wadym Jarowenko, Plainfield, both of N.J., and Richard A. Amitrano, Brooklyn, N.Y., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Dec. 21, 1972, Ser. No. 317,413
Int. Cl. C08b *19/06*
U.S. Cl. 260—233.3 R 3 Claims

1. A cross-linked, hydroxypropylated high amylose starch product, the starch containing at least 50 per cent amylose, the starch product having a hydroxypropyl M. S. between 0.10

and 0.30 and cross-linked with a cross-linking agent to an extent characterized in that an aqueous dispersion containing 5.0 per cent, by weight, of said starch product has a Brookfield viscosity measured at 75°F between 0 and 1500 centipoises after being cooked at 5.0 per cent, by weight, starch product solids concentration, dry basis, in a pH 6.5 buffered salt solution at 180°F for 25 minutes and standing at room tempera-



ture for 24 hours, and a Brookfield viscosity measured at 75°F between 1,500 and 10,000 centipoises after being cooked at 5.0 per cent, by weight, starch product solids concentration, dry basis, in a pH 6.5 buffered salt solution at 212°F for 10 minutes followed by 15 minutes at 250°F and after standing for 24 hours at room temperature, said viscosity after cooking at 250°F being at least four times said viscosity after cooking at 180°F.

3,904,602

PROCESS FOR THE MANUFACTURE OF TETRASUBSTITUTED UREAS

Tibor Somlo, Birsfelden, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

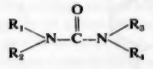
Filed Feb. 11, 1972, Ser. No. 225,625

Claims priority, application Switzerland, Feb. 16, 1971, 2247/71; Jan. 20, 1972, 824/72

Int. Cl.² C07D *203/00*

U.S. Cl. 260—239 E **9 Claims**

1. A process for the manufacture of a N,N,N′,N′,-tetrasubstituted urea of the formula



wherein R_1, R_2, R_3 and R_4 are benzyl or alkyl of 1 to 18 carbon atoms, or R1 and R2 or R3 and R4 form, together with the nitrogen atom, aziridino, pyrrolidino, piperidino, hexamethyleneimino or morpholino, comprising the steps of treating a N,N-disubstituted carbamic acid halide of the formula: $(R_1)(R_2)NCOX$, wherein X is chlorine or bromine, with a secondary amine of the formula: $(R_3)(R_4)NH$, and then with anhydrous ammonia.

3,904,603

2,3,4,5-TETRAHYDRO-4,4-DIALKYL-1H-1,4-BENZODIAZEPINE HALIDES

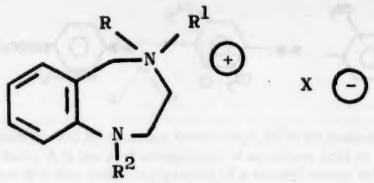
Dong H. Kim, Wayne, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Aug. 1, 1974, Ser. No. 493,808

Int. Cl.² C07D *243/14*

U.S. Cl. 260—239 BD **4 Claims**

1. A compound of the formula



wherein R and R^1 are, independently, methyl, ethyl, or propyl; R^2 is hydrogen, methyl, ethyl, or propyl; and X is the chlorine, bromine, or iodine anion.

3,904,604

1-AMINO SUBSTITUTED 1-CYCLOALKANE DERIVATIVES OF 6-AMINOPENICILLANIC ACID

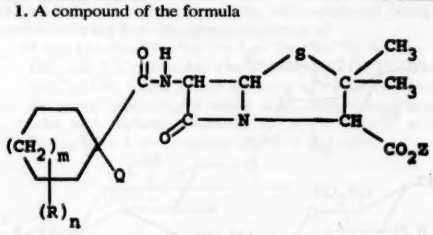
Bong Kuk Lee, Old Bridge; Saul Lewis Neidleman, Trenton, both of N.J., and Dewey D. Y. Ryu, Holliston, Mass., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 176,717, Aug. 31, 1971, abandoned. This application Aug. 21, 1972, Ser. No. 282,095

Int. Cl. C07d *99/16*

U.S. Cl. 260—239.1 **6 Claims**

1. A compound of the formula



wherein *m* is 0, 1 or 2; Q is —N=CHR¹ or —NH-CH_2R^3 wherein R^1 is alkyl of from 1 to 7 carbon atoms, cycloalkyl of from 5 to 7 carbon atoms, phenyl, naphthyl, substituted phenyl or naphthyl wherein the substituent is halogen, hydroxy, amido, alkyl of from 1 to 4 carbon atoms, alkoxy of from 1 to 4 carbon atoms, or acyl of from 1 to 4 carbon atoms; *n* is 0, 1, 2 or 3; R is alkyl of from 1 to 7 carbon atoms, hydroxy or halogen, and R^2 is cycloalky of from 5 to 7 carbon atoms; and Z is hydrogen, alkyl of from 1 to 7 carbon atoms, or a pharmaceutically acceptable alkali metal or alkaline earth metal or a pharmaceutically acceptable organic base selected from triethylamine, procaine, dibenzylamine, N-benzyl-β-phenethylamne, N,N′-dibenzylethylenediamine, or N-ethylpiperidine.

3,904,605

PENICILLIN OXIDATION PROCESS

Patrick J. Baker, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Sept. 12, 1972, Ser. No. 288,459

Int. Cl.² C07D *499/04*

U.S. Cl. 260—239.1 **9 Claims**

1. A process for preparing a 6-acylamidopenicillin sulfoxide which comprises:

a. diluting a penicillin-containing filtered fermentation broth derived from a penicillin fermentation with a miscible organic liquid selected from acetone, methyl ethyl ketone, methanol, ethanol, isopropanol, t-butanol, acetonitrile and propionitrile in an amount sufficient to cause precipitation of non-penicillin insolubles,

b. treating the penicillin containing solution from step (a) at a temperature of from about −20° C. to about 25°C. with a per-acid oxidizing agent selected from peracetic acid, per-

propionic acid, perbenzoic acid, and persuccinic acid which is soluble in the liquid mixture in an amount sufficient to effect oxidation of the penicillin to penicillin sulfoxide,

c. treating the oxidized mixture from step (b) with an acid to lower the pH to 1.5 to 2.5 to induce the penicillin sulfoxide crystallization,

d. mixing an aqueous medium with the acidified mixture from step (c) to optimize crystallization of the penicillin sulfoxide, and

e. separating penicillin sulfoxide from the liquid mixture in step (d).

3,904,606

PROCESS FOR PREPARING OPTICALLY ACTIVE 6-(α-AMINO-ACETAMIDO)PENICILLANIC ACIDS AND 7-(α-AMINOACETAMIDO) CEPHALOSPORANIC ACIDS

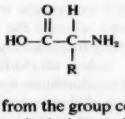
Roger G. Williams, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 12, 1973, Ser. No. 323,072
Int. Cl.² C07D 499/12
U.S. Cl. 260—239.1 8 Claims

1. A process for preparing optically active 6-(α-aminoacetamido) penicillanic acids and 7-(α-aminoacetamido) cephalosporanic acids which comprises

1. bringing together in the presence of an inert solvent

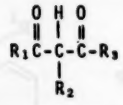
a. the racemate of a monocarboxylic α-amino acid selected from the group consisting of proline, histidine, tryptophane and an acid of the formula



wherein R is selected from the group consisting of aliphatic of one to 20 carbon atoms, inclusive, cycloalkyl of three to eight carbon atoms, inclusive, cycloalkenyl of four to eight carbon atoms, inclusive, cycloalkadienyl of five to seven carbon atoms, inclusive, aryl of six to 12 carbon atoms, inclusive, aralkyl of seven to eleven carbon atoms, inclusive; said α-amino monocarboxylic acid unsubstituted or substituted with a group which is inert to reaction with a β-dicarbonyl compound described below:

b. an optically active amine base with a dissociation constant of from about 10^{-9} to about 10^{-12};

c. a β-dicarbonyl compound of the formula



wherein R_1 is hydrocarbyl of one to 20 carbon atoms, inclusive, R^2 is hydrogen or hydrocarbyl of one to twenty carbon atoms, inclusive, R_3 is hydrocarbyl or hyrocarboxy, each of one to 20 carbon atoms, inclusive, R_1 and R_3 when taken together are alkylene having from two to three carbon atoms, inclusive, separating the valencies thereof, and R_1 and R_2 when taken together and R_2 and R_3 when taken together each represent alkylene having from three to four carbon atoms, inclusive, separating the valencies thereof, whereby there is obtained a mixture of the D and L-diastereoisomeric salt of said amine base and the eneamine derivative of said α-amino monocarboxylic acid and said β-dicarbonyl compound,

2. separating the D- and L-isomers of said mixture of diastereoisomeric salts; and

3. reacting the separated isomer with a member selected from the group consisting of 6-amino penicillanic acid and 7-aminocephalosporanic acid.

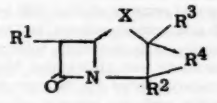
3,904,607

2,3-LOWER ALKYLENEPENAM-3-CARBOXYLIC ACID DERIVATIVES AND PROCESSES FOR THE PREPARATION THEREOF

Takashi Kamiya, Suita; Tsutomu Teraji, and Masashi Hashimoto, both of Toyonaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Nov. 23, 1973, Ser. No. 418,259
Claims priority, application Japan, Nov. 22, 1972, 47-117385; Nov. 27, 1972, 47-119113; Dec. 15, 1972, 47-126636; Aug. 2, 1973, 48-87851; Aug. 2, 1973, 48-87854; Aug. 2, 1973, 48-87855
Int. Cl.² C07D 99/16
U.S. Cl. 260—239.1 72 Claims

1. A compound of the formula:



wherein R^1 is amino, (1-halophenylimino-1-lower alkanoylthiomethyl)amino, lower alkoxycarbonylamino, phenyl(lower-)alkoxycarbonylamino, lower alkylthio(lower)alkanoylamino, phenyl(lower)alkanoylamino, phenoxy(lower)alkanoylamino, 3-penylureido, phenylglyoxylamido, phenylthiocarbamoylamino, phenyl and amino substituted lower alkanoylamino, phenyl and hydroxy substituted lower alkanoylamino, phenyl and lower alkoxycarbonylamino substituted lower alkanoylamino, phenyl and lower alkanoyloxy substituted lower alkanoylamino, phenyl and semicarbazono substituted lower alkanoylamino, halophenylthioureido, phthalimido, lower alkanoylaminobenzensulfonamido, phenyl and halophenoxy substituted lower alkanoylamino, halophenyl(lower)alkanoylamino, 3-halophenyl-5-lower alkylisoxazol-4-ylcarbonamido, thienyl(lower)alkanoylamino, tetrazolyl(lower)alkanoylamino, thiadiazolythio(lower)alkanoylamino, halobenzotriazolyl(lower)alkanoylamino or phenyl and sulfo substituted lower alkanoylamino, R^2 is carboxy or a conventional protected carboxy selected from the group consisting of ester, acid amide, acid anhydride and a carboxy salt, R^3 is a lower alkyl, R^4 is lower alkylene and X is —S— or

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3,904,608

PROCESS FOR THE PRODUCTION OF LACTAM

Kazuo Takayanagi, and Takeshi Sonoda, both of Kamakura, Japan, assignors to Toray Industries, Inc., Muro, Japan

Filed Sept. 6, 1973, Ser. No. 394,714
Claims priority, application Japan, Sept. 8, 1972, 47-89509
Int. Cl.² C07D 201/04
U.S. Cl. 260—239.3 A 16 Claims

1. A process for production of lactam in high yields which comprises contacting, in a liquid phase and at a temperature of about 60° to 180°C., a cycloalkanone oxime having 6 to 12 carbon atoms in its ring with at least one metal salt selected from the group consisting of manganese sulfate, ferrous sulfate, ferric sulfate, cobalt sulfate, nickel sulfate, zinc sulfate, cadmium sulfate, manganese phosphate, ferrous phosphate, ferric phosphate, cobalt phosphate, nickel phosphate, zinc phosphate and cadmium phosphate in the presence of at least one mole of hydrogen chloride per mole of the cycloalkanone oxime, thereby said cycloalkanone oxime being subjected to Beckmann rearrangement to lactam.

3,904,609

METHOD FOR THE PREPARATION OF PURE LACTAM FROM ITS PRIMARY SOLUTIONS IN AN ORGANIC SOLVENT

Roberto Mattone, Seveso; Giancarlo Sioli, Como, and Luigi Giuffre, Milan, all of Italy, assignors to Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy

Filed July 18, 1973, Ser. No. 380,332

Claims priority, application Italy, June 28, 1972, 26385/72

Int. Cl.[2] C07D *201/16*

U.S. Cl. 260—239.3 A **8 Claims**

1. A method for the preparation of a pure caprolactam from a diluted acidic solution thereof, comprising first extracting the caprolactam from the said diluted acidic solution thereof with a primary substituted phenol solvent to form a caprolactam-containing primary solution,

supplementing said primary solution with a compound compatible with said primary solvent, and selected from the group consisting of cyclohexane, toluene, benzene, and aliphatic, aromatic and chlorinated hydrocarbons, and with a secondary solvent for the caprolactam, which is not compatible with the primary solvent, to promote formation of an extracted caprolactam-containing secondary solution; whereby precipitation phenomena is promoted, and then

separating the caprolactam-containing secondary solution from the mixture of the primary solvent and the compound compatible therewith, and

removing the caprolactam from said secondary solution.

3,904,610

METHOD OF PREPARING AN α-AMINO-ω-LACTAM

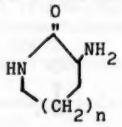
Robert Fuhrmann, Morris Plains, and John Pisanchyn, Morristown, both of N.J., assignors to Allied Chemical Corporation, New York, N.Y.

Filed Nov. 22, 1974, Ser. No. 526,281

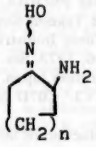
Int. Cl.[2] C07D *223/12, 211/76, 207/26*

U.S. Cl. 260—239.3 R **12 Claims**

1. In a method of producing an α-amino-ω-lactam of the formula



by the Beckmann rearrangement of an α-aminocycloalkanone oxime of the formula



wherein *n* is an integer between 0 and 12, the improvement comprising the steps of

1. dissolving, in a first reaction step, said oxime or a mixture containing said oxime and an acid salt thereof, and NH_4Cl in sulfuric acid of a concentration of about 100 to 110% while maintaining a temperature in said first reaction step in the range of about −5° to 35°C;
2. removing the evolved HCl gas formed in said first reaction step;
3. adding, in a second reaction step, the solution from said first reaction step to sulfuric acid of a concentration of about 100 to 110% or to a Beckmann rearrangement mixture derived from said oxime containing sulfuric acid of said concentration while maintaining a temperature in said second reaction step below about 100°C by cooling, the rate of addition of said solution from said first reaction step and the amount of cooling being adjusted to maintain said temperature in said range, whereby a rearrangement mixture is formed;
4. removing the evolved HCl gas from said second reaction step; and
5. stripping residual HCl from said rearrangement mixture whereby a lactam solution substantially free of HCl is formed.

6. The process of claim 1 wherein said α-amino-cycloalkanone oxime is α-aminocyclohexanone oxime and said α-amino-ω-lactam is α-amino-ε-caprolactam.

3,904,611

PREPARATION OF 17α-PROPADIENYL STEROIDS

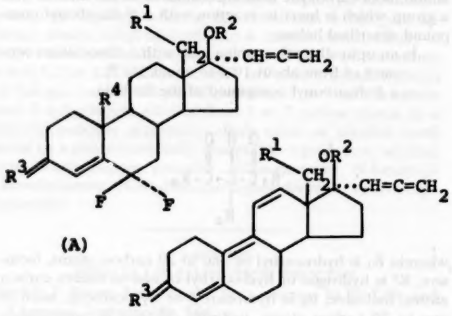
John J. Edwards, Los Altos, Calif., assignor to Syntex Corporation, Panama, Panama

Continuation-in-part of Ser. No. 297,855, Oct. 16, 1972, which is a continuation-in-part of Ser. No. 148,174, May 28, 1971, which is a continuation-in-part of Ser. No. 877,521, Nov. 17, 1969, abandoned, which is a continuation-in-part of Ser. No. 817,563, April 18, 1969, abandoned. This application Feb. 11, 1974, Ser. No. 441,223

Int. Cl.[2] C07J *17/00*

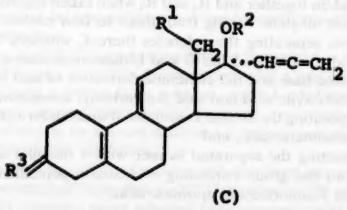
U.S. Cl. 260—239.55 R **23 Claims**

1. The method which comprises treating a 17α-(3-substituted propynyl) steroid, wherein the substituent is tetrahydrofuran-2-yloxy, tetrahydropyran-2-yloxy, 4-methoxytetrahydropyran-4-yloxy, halo, alkylsulfonyloxy or arylsulfonyloxy, together with an aluminum hydride reagent selected from the group consisting of aluminum hydride, lithium aluminum hydride, lithium di-(2-methoxyethoxy)-aluminum hydride, lithium diisobutylaluminum hydride and sodium aluminum hydride, at a temperature of from about 20° to about 120°C., whereby to provide the corresponding 17α-propadienyl compound represented by the following formulas:

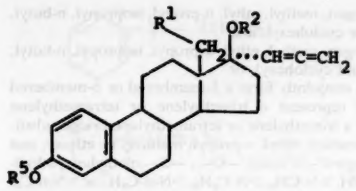


(A)

(B)



(C)



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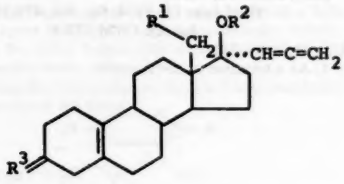
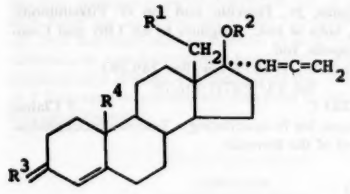
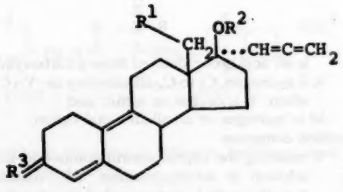


(III)



(IV)



(V)

wherein,

R^1 is hydrogen or lower alkyl of from one to three carbon atoms, inclusive;

R^2 is hydrogen, tetrahydrofuran-2-yl, tetrahydropyran-2-yl, 4-methoxytetrahydropyran-4-yl, or a carboxylic acyl group containing less than 12 carbon atoms;

R^3 is an oxo group or the group

in which R^6 is hydrogen, tetrahydrofuran-2-yl, tetrahydropyran-2-yl, 4-methoxytetrahydropyran-4-yl, or a carboxylic acyl group containing less than 12 carbon atoms;

R^4 is hydrogen or methyl; and

R^5 is hydrogen, lower alkyl of from 1 to 8 carbon atoms, inclusive, cycloalkyl, tetrahydrofuran-2-yl, tetrahydropyran-2-yl, 4-methoxytetrahydropyran-4-yl or a carboxylic acyl group containing less than 12 carbon atoms.

3,904,612

PYRIMIDINE DERIVATIVES AND PROCESS FOR PREPARING THE SAME

Takeshi Nagasawa; Katumasa Kuroiwa, and Kouichi Narita, all of Koriyama, Japan, assignors to Nitto Boseki Co., Ltd., Fukushima, Japan

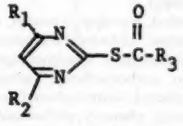
Filed Sept. 20, 1972, Ser. No. 290,575

Claims priority, application Japan, July 22, 1971, 46-74041; Sept. 23, 1971, 46-74237; Oct. 19, 1971, 46-82663

Int. Cl. C07d *51/40*

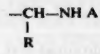
U.S. Cl. 260—240 J **20 Claims**

1. A pyrimidine derivative represented by the formula,

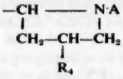


(I)

wherein R_1 and R_2 are individually hydrogen or methyl; R_3 is C_{1-17} alkyl which may contain one or more halogens or hydroxyls, C_{2-17} alkenyl, phenyl which may contain hydroxyl, nitro, amino, or methyl, naphthyl, anthryl, 5- or 6-membered heterocyclic ring which may contain one or more hetero atoms of O, N or S, phenyl-C_{1-5} alkyl which may contain methoxy, halogen, nitro or C_{1-2} alkyl on the benzene mucleus, phenyl-C_{2-5} alkenyl, a group of the formula



wherein R is a substituent at the α-carbon of an β-amino acid and A is hydrogen or a protective group for an amino acid,



wherein R_4 is hydrogen or hydroxyl and A is as defined above, $—CH_2CH_2NH.A$ wherein A is as defined above,

wherein A is as defined above, $—CH_2—CH_2—CH_2—NH.A$ where A is as defined above or $—CH_2—(CH_2)_3—CH_2—NH.A$ wherein A is as defined above.

3,904,613

HEMICYANINE DYESTUFFS

Ernst Schmitt, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

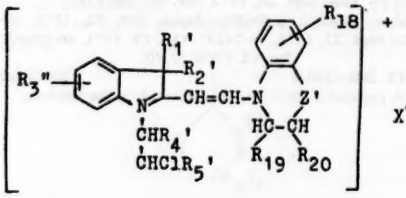
Filed Dec. 9, 1971, Ser. No. 206,522

Claims priority, application Germany, Dec. 9, 1970, 2060615

Int. Cl. C07d *27/56*

U.S. Cl. 260—240.8 **5 Claims**

1. dyestuff of the formula



in which

R_1' is methyl, ethyl or n-propyl;

R_2' is methyl, ethyl or n-propyl;

R_3'' is hydrogen, methyl, ethyl, n-propyl, i-propyl, n-butyl, n-hexyl, n-dodecyl, fluorine, chlorine, trifluoromethyl, nitrile, carboxyl, methylmercapto, ethylmercapto, methylsulphonyl, acetamino, carbomethoxy, carboethoxy, sulphamoyl, cyclohexyl, phenyl, 4-nitro-phenyl, methoxy, ethoxy, n-propoxy, n-butoxy, phenoxy, phthalimidoethyl, 5,6-benzo, or 6,7-benzo; R_4' and R_5' independently of one another are hydrogen, methyl, ethyl, n-propyl, n-butyl, n-pentyl, n-hexyl, n-nonyl, carbophenoxy, methoxymethyl, ethoxymethyl, n-propoxymethyl, n-butoxymethyl, n-hexyloxymethyl, n-octyloxymethyl, n-nonyloxymethyl, n-decyloxymethyl, n-dodecyloxymethyl, phenoxymethyl, p-nitrophenoxymethyl, p-methoxyphenoxymethyl, p-chlorophenoxymethyl, phenyl, 4-methoxyphenyl, allyloxymethyl, chlorine or nitrile; or one of R_4' and R_5' is hydrogen and the other is chloromethyl;

X^- is an anion;

R_{18} is hydrogen or one or more identical or different radicals selected from the group consisting of chlorine, methyl, ethyl, n-propyl, iso-propyl, n-butyl, tert.-butyl, methoxy, ethoxy, n-propoxy, iso-propoxy, amino, acetamino, n-propionylamino, dimethylamino, diethylamino and di-(β-hydroxyethyl)-amino;

R_{19} is hydrogen, methyl, ethyl, n-propyl, isopropyl, n-butyl, n-hexyl or cyclohexyl; and

R_{20} is hydrogen, methyl, ethyl, n-propyl, isopropyl, n-butyl, n-hexyl and cyclohexyl; or

R_{19} and R_{20} conjointly form a 5-membered or 6-membered ring and represent a trimethylene or tetramethylene bridge or a trimethylene or tetramethylene bridge substituted by methyl, ethyl, n-propyl, methoxy or ethoxy; and

Z' is a single C—C bond, —O—, —S—,methylene, ethylidene, >NH, >N-CH_3, >N-C_2H_5, >N-n-C_3H_7 or >N-n-C_4H_9.

3,904,614

ARYL HETEROCYCLIC TETRAZINES AND METHOD OF PREPARATION THEREOF

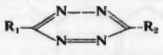
Stanley Albert Lang, Jr., Pomona, and Elliott Cohen, Pearl River, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed June 11, 1974, Ser. No. 478,188

Int. Cl. C07d *57/08*

U.S. Cl. 260—241 **10 Claims**

1. An s-tetrazine of the formula:



wherein R_1 is selected from the group consisting of 2-furyl, 3-furyl, halo-2-furyl, 2-thienyl, 3-thienyl, loweralkyl-2-thienyl, halo-2-thienyl, 2-pyridyl, 4-pyridyl and 2-benzofuranyl and R_2 is hydrogen or lower alkyl.

3,904,615

PROCESS FOR CLEAVING CEPHALOSPORIN COMPOUNDS

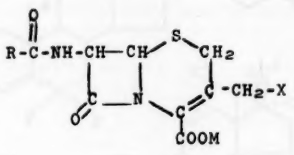
Harvey M. Higgins, Jr., Danville, and Jon W. Fitzsimmons, Indianapolis, both of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed May 1, 1972, Ser. No. 249,293

Int. Cl.[2] C07D *501/18*

U.S. Cl. 260—243 C **5 Claims**

1. In the process for N-deacylating a 7-acylaminocephalosporin compound of the formula



wherein

is an acyl group derived from a carboxylic acid;

X is hydrogen, C_2 to C_8-alkanoyloxy or -Y-(C_1 to C_{10} -alkyl) where Y is oxygen or sulfur; and

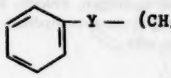
M is hydrogen or an alkali metal cation;

which comprises

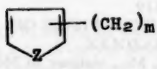
1. reacting the cephalosporin compound in suspension or solution in tetrahydrofuran, bis(2-methoxyethyl)ether, 2-methoxyethyl acetate, ethylene glycol diacetate, 1,4-dioxane or 1,3-dioxane or water miscible liquid mixtures thereof with an acyl halide of a carboxylic acid

$R'''—COOH$

wherein R''' is C_1–C_8 alkyl, alkenyl, or alkynyl; halo-C_1-C_8 alkyl, alkenyl or alkynyl; phenyl



or



wherein

Y is oxygen, sulfur or a carbon to carbon bond;

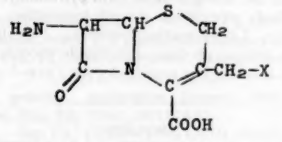
n is an integer of 0 to 3 and is at least 1 when Y is oxygen or sulfur;

Z is oxygen, sulfur or N-H; and

m is an integer of 1 to 3;

to form the mixed anhydride with said cephalosporin compound and said acid;

2. reacting the cephalosporin mixed anhydride with a halogenating agent to form the cephalosporin imino halide;
3. reacting the imino halide with an alcohol to form the cephalosporin imino ether; and
4. hydrolyzing the imino ether to form a 7-aminocephalosporin nucleus of the formula



the improvement which comprises incorporating between 3 and 10 millimoles of quinoline, isoquinoline, 3-picoline, 4-picoline, pyridine or an acid addition salt of one or more of such bases per 20 millimoles of said 7-acylaminocephalosporin, into the suspension or solution of said 7-acylaminocephalosporin in tetrahydrofuran, bis(2-methoxyethyl) ether, 2-methoxyethyl acetate, ethylene glycol diacetate, 1,4-dioxane or 1,3-dioxane containing medium prior to the addition of the halogenating agent.

3,904,616

CEPHALOSPORINS

Keiichi Sugimoto, Kawanishi; Kunio Kobayashi, Toyonaka; Koji Nishijima, Takatsuki, and Shiro Morimoto, Tantakabayashi, all of Japan, assignors to Takeda Chemical Industries, Ltd., Japan

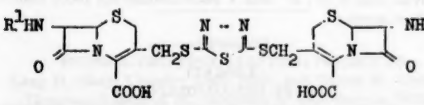
Filed July 18, 1972, Ser. No. 273,019

Claims priority, application Japan, July 29, 1971, 46-56894

Int. Cl. C07d *99/24*

U.S. Cl. 260—243 C **17 Claims**

1. A compound of the formula



wherein R^1 and R^2 are, the same or different, hydrogen atom or an acyl group of the formula:

wherein R represents phenyl, phenylthio, thienyl, 2-oxo-primidin-4-ylthio, 2-chloro-pyrimidin-4-ylthio, pyridylthio or 2-oxo-5-methyl-pyrimidin-4-ylthio and X represents hydrogen, carboxyl, carbamoyl, carbamoyloxy, amino, or sulfo, or pharmaceutically acceptable salt, thereof.

3,904,617

PROCESS FOR PREPARING NEW HETEROCYCLIC DERIVATIVES

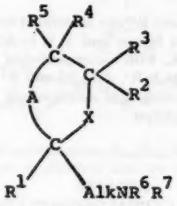
Karel Pelz, Montreal, and Thomas A. Dobson, Dollard des Ormeaux, both of Canada, assignors to Ayerst, McKenna & Harrison Ltd., Quebec, Canada

Filed Oct. 12, 1972, Ser. No. 297,130

Int. Cl.[2] C07D *279/14, 265/28, 311/94, 335/04*

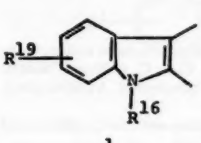
U.S. Cl. 260—243 R **32 Claims**

22. A process for the preparation of a compound of formula I

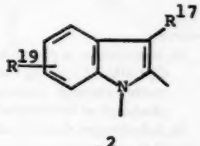


(I)

in which R^1 is lower alkyl, R^2, R^3, R^4 and R^5 are the same or different selected from the group consisting of hydrogen and lower alkyl, R^6 and R^7 are either the same or different selected from the group consisting of hydrogen and lower alkyl, or R^6 and R^7 together with the nitrogen atom to which they are joined form a heterocyclic amine radical selected from the group consisting of 1-pyrrolidinyl, piperidino, morpholino, piperazino, 4-(lower alkyl)-1-piperazinyl and 4-[hydroxy(-lower)alkyl]-1-piperazinyl, Alk is an alkylene selected from the group consisting of CR^8R^9, $CR^8R^9CR^{10}R^{11}$, $CR^8R^9CR^{10}R^{11}CR^{12}R^{13}$ and $CR^8R^9CR^{10}R^{11}CR^{12}R^{13}CR^{14}R^{15}$, wherein R^8, R^9, R^{10}, R^{11}, R^{12}, R^{13}, R^{14}, R^{15} are hydrogen or lower alkyl, X is oxy or thio and A is selected from the group consisting of

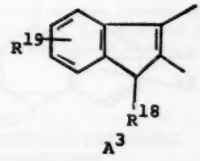


A^1



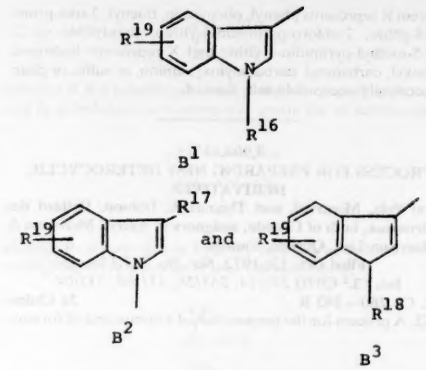
A^2

and



A^3

in which R^{16} is hydrogen or lower alkyl, R^{17} is lower alkyl, R^{18} is hydrogen or lower alkyl, and R^{19} is hydrogen, lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy or halo, or a corresponding acid addition salt thereof, which comprises treating a compound of formula B-$CR^4R^5CR^2R^3Y$ (II) in which B is selected from the group consisting of



in which R^{16}, R^{17}, R^{18} and R^{19} are as defined herein, R^2, R^3, R^4 and R^5 are as defined herein and Y is hydroxy, mercapto, -S-SO_3-Na or -S-SO_3-K, with a compound of formula R^1CO Alk NR^6R^7 (III) in which R^1, Alk, R^6 and R^7 are as defined herein or a corresponding acid addition salt thereof, in the presence of an acid catalyst.

3,904,618

7-SUBSTITUTED CEPHALOSPORIN COMPOUNDS

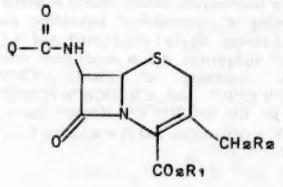
Richard P. Pioch, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Dec. 26, 1973, Ser. No. 427,949

Int. Cl.[2] C07D *501/34;* **A61K** *31/545*

U.S. Cl. 260—243 C **9 Claims**

1. The compound of the formula

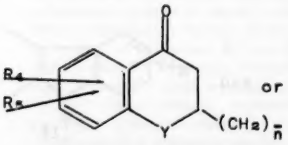


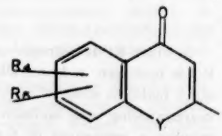
wherein:

R_1 is hydrogen, a pharmaceutically acceptable cation, C_4 to C_6 t-alkyl, C_5 to C_6 t-alkenyl, C_5 to C_7 t-alkynyl, benzyl, methoxybenzyl, nitrobenzyl, benzhydryl, trichloroethyl, phenacyl or trimethylsilyl;

R_2 is hydrogen, C_2 to C_4-alkanoyloxy or C_1 to C_4-alkoxy; and

Q is





wherein:

n is 0 or 1;

R_4 and R_5 independently are hydrogen, chloro, bromo, fluoro, nitro, amino, C_1 to C_3 acylamino, hydroxy, C_1 to C_2 alkyl, or C_1 to C_2 alkoxy; and

Y is O, S, SO or SO_2.

3,904,619

DITHIOCARBAMATE DERIVATIVES OF 1,2,4-THIADIAZOLES

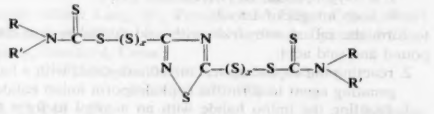
John Joseph D'Amico, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 14, 1973, Ser. No. 359,977

Int. Cl.[2] C07D *295/00, 295/30*

U.S. Cl. 260—246 B **3 Claims**

1. A compound of the formula



in which *x* is one or two, R is hydrogen, alkyl of 1–8 carbon atoms, aralkyl of 7–10 carbon atoms, cycloalkyl of 5–8 carbon atoms, and R′ is alkyl of 1–8 carbon atoms, aralkyl of 7–10 carbon atoms, cycloalkyl of 5–8 carbon atoms, or R and R′ together with the nitrogen atom form pyrrolidinyl, 2,5-dimethylpyrrolidinyl, piperidino, 4-methylpiperidino, 2,6-dimethylpiperidino, 2,4-6-trimethylpiperidino, 2-ethylpiperidino, morpholino, thiomorpholino, 2,6-dimethylmorpholino, hexahydro-1H-azepin-1-yl or azabicyclo(3.2.2)non-3-yl.

3,904,620

4-HYDROXY-5-AMINOMETHYL-1,3,3A,7-TETRAAZAINDENES

George de W. Anderson, and Ronald E. Watts, both of Hatfield Broad Oak, near Bishops Stortford, England, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

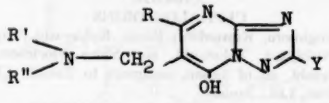
Division of Ser. No. 688,022, Dec. 12, 1967, Pat. No. 3,563,755. This application Apr. 29, 1970, Ser. No. 33,096

Claims priority, application United Kingdom, Dec. 9, 1966, 55364/66

Int. Cl.[2] C07D *295/04*

U.S. Cl. 260—247.1 L **7 Claims**

1. A tetraazaindene compound of the formula



in which R represents a hydrogen atom, an alkyl group or an alkylthio group, R′ and R″ individually represent a hydrogen atom, a lower alkyl group or together form a 5 or 6 membered heterocyclic ring, Y represents a hydrogen atom or an alkyl, alkylthio, or amine group, and the salts thereof, with the proviso that R, R′, R″ and Y each contain not more than 4 carbon atoms.

3,904,621

NOVEL BENZIMIDAZOLES

Hans Rochling, Altenhain, Taunus; Kurt Hartel, Hofheim, Taunus, and Helmut Goebel, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

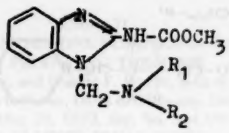
Filed June 19, 1973, Ser. No. 371,537

Claims priority, application Germany, June 21, 1972, 2230182

Int. Cl.[2] C07C *295/04*

U.S. Cl. 260—247.2 B **11 Claims**

1. A benzimidazole of the formula I



I

in which R_1 and R_2 are identical or different and are each alkyl having 1 to 18 carbon atoms, alkenyl having 3 to 18 carbon atoms, cycloalkyl having 4 to 8 carbon atoms, cycloalkylalkyl or alkylcycloalkyl having 5 to 6 carbon atoms in the ring and 1 to 3 carbon atoms in the alkyl or alkylene moiety, alkoxyalkyl and alkylthioalkyl having 2 to 12 carbon atoms altogether, carboalkoxyalkyl having 3 to 9 carbon atoms altogether, cyanoethyl, phenyl, benzyl or phenylethyl, R_1 in addition is alkoxy having 1 to 4 carbon atoms, and R_1 and R_2 together are alkylene having 4 to 7 carbon atoms optionally interrupted by O, S, >N—CH_3, >N—C_2H_5 or substituted by methyl or ethyl groups or bridged by a methylene group.

3,904,622

DIALKYLAMINOALKYL ETHERS OF 2-ALKOXY-3,5-DIHALOBENZENE

Michel Leon Thominet, Paris, France, assignor to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France, Paris, France

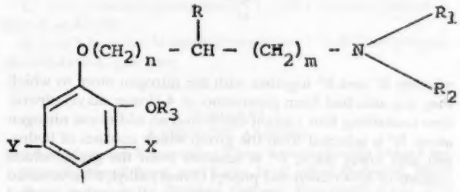
Continuation-in-part of Ser. No. 80,211, Oct. 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 798,164, Feb. 10, 1969, abandoned. This application June 13, 1973, Ser. No. 369,567

Claims priority, application France, Feb. 16, 1968, 68.140294; May 10, 1968, 68.151632

Int. Cl.² C07C *93/06;* **C07D** *295/00*

U.S. Cl. 260—247.7 S **7 Claims**

1. A dialkylaminoalkyl ether of 2-alkoxy-3,5-dihalobenzene, a non-toxic acid addition salt thereof or a quaternary ammonium salt thereof, said dialkylaminoalkyl ether of 2-alkoxy-3,5-dihalobenzene having the formula:



in which *m* is an integer from 0 through 2; and *n* is an integer from 0 through 2; R is hydrogen or lower alkyl of less than 6 carbon atoms; R_3 is lower alkyl of less than 6 carbon atoms; R_1 and R_2 are hydrogen, lower alkyl of less than 6 carbon atoms or form, together with the nitrogen atoms, morhpolino; and X and Y are the same halogens.

3,904,623

PHENOL-TRIAZINE ADDITION PRODUCTS

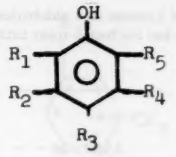
Greg D. Shay, Country Club Hills, and James H. Griffith, Homewood, both of Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio

Filed Dec. 26, 1973, Ser. No. 427,604

Int. Cl.² C07D *251/70*

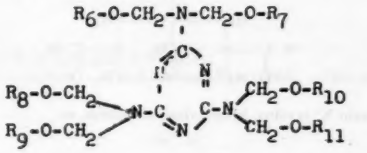
U.S. Cl. 260—249.6 **12 Claims**

1. A non-gelled, low molecular weight solid addition product having a softening point above 100°F obtained by reacting a. approximately 1.8 to 2.2 moles of at least one monohydroxy aromatic compound having the formula:



wherein the R substituents R_1, R_2, R_3, R_4 and R_5 are either the same or different and are selected from the class consisting of hydrogen, alkyl radicals of 1 to 4 carbon atoms, alkoxy radicals of 1 to 4 carbon atoms and NO_2 radicals provided that at least one of the R substituents is hydrogen and

b. approximately 1.0 mole of an alkoxymethyl amino-triazine having the formula:



wherein the R substituents, R_6, R_7, R_8, R_9, R_{10} and R_{11} are either the same or different and are alkyl radicals of 1 to 4 carbon atoms.

3,904,624

PYRIDO[1,2A]PYRIMIDINONE THIOPHOSPHATES

Jacques Perronnet, Paris, and Laurent Taliani, Les Pavillons Sous Bois, both of France, assignors to Roussel-UCLAF, Paris, France

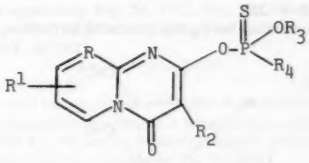
Filed Sept. 4, 1973, Ser. No. 394,078

Claims priority, application France, Sept. 11, 1972, 72.32088

Int. Cl.² C07D *239/70;* **A01N** *9/36*

U.S. Cl. 260—251 P **10 Claims**

1. A 2-thiophosphate compound of the formula



wherein R is methine, R^1 is selected from the group consisting of hydrogen, alkyl of 1 to 3 carbon atoms and NO_2, R_2 is selected from the group consisting of hydrogen, straight or branched alkyl of 1 to 3 carbon atoms, chlorine, bromine and alkoxy-carbonyl of 2 to 4 carbon atoms, R_3 is branched or straight chain alkyl of 1 to 3 carbon atoms and R_4 is alkoxy of 1 to 3 carbon atoms.

3,904,625

USE OF ION EXCHANGE RESINS IN PREPARING TETRAHYDROPYRIMIDINES

Bernardus A. Oude Alink, St. Louis, Mo., assignor to Petrolite Corporation, St. Louis, Mo.

Filed Apr. 8, 1974, Ser. No. 459,157

Int. Cl.² C07D *239/00*

U.S. Cl. 260—251 R **12 Claims**

1. A process of preparing a 2,3,4,5-tetrahydropyrimidine which comprises reacting a carbonyl compound from the

group consisting of ketones and aldehydes with ammonia in the presence of an ion exchange resin catalyst.

3,904,626

SUBSTITUTED TRIAZABICYCLONONANES

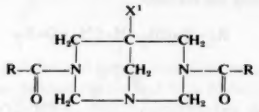
Edward B. Hodge, Terre Haute, Ind., assignor to Commercial Solvents Corporation, Terre Haute, Ind.

Continuation-in-part of Ser. No. 141,973, May 10, 1971, abandoned. This application Aug. 23, 1974, Ser. No. 499,872

Int. Cl.[2] C07D *239/04*

U.S. Cl. 260—256.4 H **20 Claims**

1. A compound of the formula



wherein X^1 is nitro, hydroxylamino, amino, or

R is methyl, ethyl or phenyl.

3,904,627

1-METHYL-3-ALKOXYMETHYL-5,5-DISUBSTITUTED BARBITURIC ACID COMPOUNDS

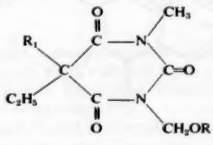
Julius A. Vida, Boston, and Carlos M. Samour, Wellesley, both of Mass., assignors to The Kendall Company, Walpole, Mass.

Filed June 2, 1972, Ser. No. 259,252

Int. Cl.[2] C07D *239/62*

U.S. Cl. 260—257 **7 Claims**

1. A compound having the structural formula



wherein R is alkyl having 1–4 carbon atoms and R_1 is phenyl or ethyl.

3,904,628

NOVEL CYCLOALKANOL FUMARATE ETHERS AND A PROCESS FOR THE PREPARATION THEREOF

Zoltan Budai; Laszlo Pallos; Lujza E. Petocz, and Ibolya Kosoczky, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

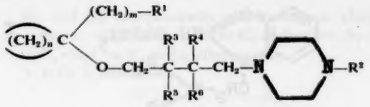
Filed July 12, 1972, Ser. No. 271,001

Claims priority, application Austria, July 29, 1971, 1932/71

Int. Cl.[2] C07D *295/00*

U.S. Cl. 260—268 R **2 Claims**

1. A cycloalkanol ether of the formula



(I),

or a pharmaceutically acceptable salt thereof;

wherein

n is an integer of 4 to 7,

m is an integer of 0 to 12,

R^1 for hydrogen, phenyl, monohalophenyl or dihalophenyl group,

R^2 stands for hydrogen, C_{1-4} alkyl, C_{1-4} hydroxyalkyl or trimethoxybenzoyloxy C_{1-4} alkyl group,

R^3 and R^4 and R^5 and R^6 each represent together a valence bond.

3,904,629

4-ALKYL CYCLOALKYL-1-PIPERAZINO-IMIDAZOLIDIN-2-ONES OR THIONES

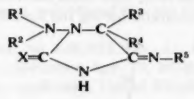
Amedeo Failli, Montreal, and Manfred Gotz, Hudson, both of Canada, assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 55,952, July 17, 1970, Pat. No. 3,707,472. This application Oct. 27, 1972, Ser. No. 301,413

Int. Cl.[2] C07D *295/22*

U.S. Cl. 260—268 N **5 Claims**

1. A compound selected from those of the formula



wherein R^1 and R^2 together with the nitrogen atom to which they are attached form piperazino or 4-(lower alkyl) piperazino containing four carbon atoms and an additional nitrogen atom. R^3 is selected from the group which consists of hydrogen and lower alkyl; R^4 is selected from the group which consists of lower alkyl and phenyl (lower) alkyl; R^5 is selected from the group which consists of lower alkyl and cycloalkyl having from five to six carbon atoms; *X* is selected from the group which consists of oxygen and sulfur; and acid addition salts thereof with pharmacologically acceptable acids.

3,904,630

8-N-METHYLPIPERAZINYL-N'-CARBONYLDIBENZO-BICYCLOOCTADIENE AND SALTS THEREOF

Walton James Hammar, and Alvin C. Conway, both of St. Paul, Minn., assignors to Riker Laboratories, Inc., Northridge, Calif.

Filed Mar. 8, 1973, Ser. No. 339,359

Int. Cl.[2] C07D *295/16*

U.S. Cl. 260—268 PC **7 Claims**

1. A compound of the group consisting of 8-(N-methylpiperazinyl-N'-carbonyl)dibenzobicyclo[3.2.1]octadiene and pharmaceutically acceptable salts thereof.

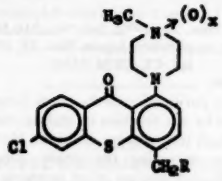
3,904,631

NOVEL THIOXANTHENONE COMPOUNDS AND MEANS OF PRODUCING THE SAME

Edward F. Elslager, and Donald F. Worth, both of Ann Arbor, Mich., assignors to Parke, Davis & Company, Detroit, Mich.

Filed May 29, 1973, Ser. No. 364,699
Int. Cl.[2] C07D 295/10, 295/22
U.S. Cl. 260—268 TR 7 Claims

1. A member selected from the group consisting of a free base having the formula



and its pharmaceutically acceptable acid addition salts; where R is H or OH and x is zero or one.

3,904,632

(−)-DI-O-ISOPROPYLIDENE-2-KETO-L-GULONATES

Charles William Den Hollander, Midland Park; Willy Leimgruber, Montclair, and Ernest Mohacsi, Nutley, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 251,134, May 8, 1972, Pat. No. 3,855,227, which is a division of Ser. No. 795,333, Jan. 30, 1969, Pat. No. 3,682,925. This application Sept. 23, 1974, Ser. No. 508,130
Int. Cl.[2] C07D 221/28, 407/04
U.S. Cl. 260—285 2 Claims

1. (+)-3-methoxymorphinan (−)-di-O-isopropylidene-2-keto-L-gulonate.

2. (+)-3-hydroxy-N-methylmorphinan (−)-di-O-isopropylidene-2-keto-L-gulonate.

3,904,633

LYSERGIC AMIDES

Erzebet Mago nee Karacsony; Tibor Balogh; Emilia Uskert nee Dievald; Jozsef Borsi, and Lajos Wolf, all of Budapest, Hungary, assignors to Richter Gedeon Vegyeszeti Gyar RT, Budapest, Hungary

Filed Feb. 5, 1973, Ser. No. 329,606
Int. Cl. C07d 43/20
U.S. Cl. 260—285.5 2 Claims

1. 1-methyl-d-lysergyl-L-(+)-α-amino butyric acid methyl ester or a pharmaceutically acceptable acid addition salt thereof.

2. 1-methyl-d-lysergyl-L-(+)-α-amino butyric acid methyl ester maleate.

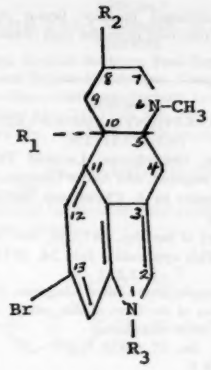
3,904,634

BROMOERGOLINES AND PROCESS FOR PREPARING THE SAME

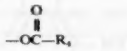
Giuliana Arcari; Luigi Bernardi; Alfredo Glasser, and Bianca Patelli, all of Milan, Italy, assignors to Farmitalia Societa Farmaceutici Italia, Milan, Italy

Filed June 21, 1973, Ser. No. 372,320
Claims priority, application Italy, June 22, 1972, 26024/72
Int. Cl. C07d 457/02, 457/04, 457/06
U.S. Cl. 260—285.5 15 Claims

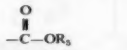
3. A compound of the formula:



wherein R_1 is hydrogen or methoxy;
R_2 is $-CONH_2$; $-CH_2X$ wherein X is $-NH_2$, $-OH$, or



wherein R_4 is phenyl, pyrrolyl or 5-bromopyridyl; or



wherein R_5 is hydrogen or lower alkyl; and
R_3 is hydrogen or methyl.

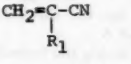
3,904,635

METHOD FOR PREPARING N-ALKYL-α,β-UNSATURATED AMIDE

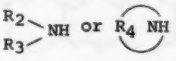
Saburo Senoo; Naoya Kominami; Yohei Fukuoka, and Katsuyoshi Sasaki, all of Tokyo, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 4,777, Jan. 21, 1970, abandoned. This application July 20, 1973, Ser. No. 381,200
Claims priority, application Japan, Feb. 4, 1969, 44-7826; Feb. 4, 1969, 44-7827
Int. Cl. C07d 29/20
U.S. Cl. 260—293.86 18 Claims

1. A method for preparing an N-alkyl-α,β-unsaturated amide, which comprises reacting at a temperature ranging from 100° to 300° C, and under superatmospheric pressure, α,β-unsaturated nitrile represented by the formula,



wherein R_1 represents a hydrogen atom or an alkyl group of one to six carbon atoms with an alkylamine represented by the formula,



wherein R_2 represents a hydrogen atom or an alkyl group of one to six carbon atoms, R_3 an alkyl group of one to six carbon atoms, and R_4 an alkylene group having four to five carbon atoms, and water, wherein the alkylamine is used in a molar amount of 1–10 times as much as that of the α,β-unsaturated nitrile, and wherein the α,β-unsaturated nitrile, alkylamine and water are heated while maintaining the liquid phase and then the alkylamine is removed from the reaction system while

heating the thus obtained reaction liquor or N-alkyl-β-alkylaminoamide is removed from the thus obtained reaction liquor.

3,904,636
3-SULFONAMIDO-4-PHENYL AMINOPYRIDINES AND DERIVATIVES

Jacques E. Delarge, Dolembreux; Leopold Thunus, Liege; Albert Lapiere, Tongeren, and Andre Georges, Ottignies, all of Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium

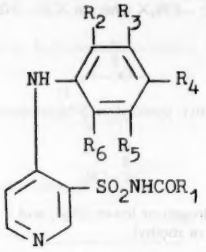
Continuation-in-part of Ser. No. 197,139, Nov. 9, 1971, Pat. No. 3,819,639. This application July 24, 1973, Ser. No. 382,222

Claims priority, application United Kingdom, July 28, 1972, 35510/72The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.

Int. Cl. C07d *31/48*

U.S. Cl. 260—294.8 F **6 Claims**

1. A compound having the following general formula:



(I)

in which R_1 represents an alkyl group containing 1 to 4 carbon atoms, whereas R_2, R_3, R_4, R_5 and R_6 represent hydrogen or a methyl, nitro, trifluoromethyl or chloro group, with the proviso that at least one of the symbols R_2, R_3, R_4, R_5 and R_6 does not represent hydrogen and the number of substituents other than hydrogen represented by R_2, R_3, R_4, R_5 and R_6 does not exceed two.

3,904,637
7aH,8aH-BISBENZOTHIAZOLO[3,2-a;-3′,2′-a]PYRANO [3,2-c;5,6-c′]DIPYRIDINIUM COMPOUNDS AND RELATED DERIVATIVES THEREOF

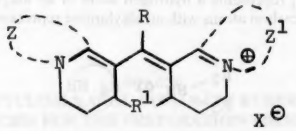
Lewis L. Lincoln, and Donald W. Heseltine, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 245,391, April 19, 1972, Pat. No. 3,821,233, which is a division of Ser. No. 85,708, Oct. 30, 1970, Pat. No. 3,679,427. This application Sept. 10, 1973, Ser. No. 396,343

Int. Cl.² C07D *213/34*

U.S. Cl. 260—294.8 A **10 Claims**

1. A compound having the formula:



wherein:

a. each of Z and Z^1 represents the non-metallic atoms necessary to complete a heterocyclic nucleus selected from the group consisting of thiazole, benzothiazole, oxazole and benzoxazole,

b. R represents a member selected from the group consisting of a hydrogen atom, an alkyl radical having from 1 to 6 carbon atoms, phenyl or naphthyl,

c. R^1 represents a member selected from the group consisting of an oxygen atom and a sulfur atom,

d. X^- represents an anion.

3,904,638
PURIFICATION OF CRUDE 2-MERCAPTOBENZOTHIAZOLE

Seiji Sagawa, Hirakata; Haruo Kunihiro, Toyonaka; Osamu Kimura, Toyonaka, and Masatoshi Inoue, Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

Filed Nov. 29, 1972, Ser. No. 310,582

Claims priority, application Japan, Nov. 29, 1971, 46-96628

Int. Cl. C07d *91/48*

U.S. Cl. 260—306 **18 Claims**

1. A process for purification of the crude 2-mercaptobenzothiazole obtained by the reaction of aniline, carbon disulfide and sulfur at a high temperature under an elevated pressure which comprises dispersing the crude 2-mercaptobenzothiazole in a sufficient amount of an aromatic hydrocarbon, nitrobenzene or chlorobenzene to dissolve some of the components in the crude 2-mercaptobenzothiazole without dissolving the 2-mercaptobenzothiazole, filtering the resultant dispersion, discharging the collected particles into sufficient aqueous alkaline solution to substantially separate 2-mercaptobenzothiazole from the remainder of the particles, and filtering the resulting solution to give an aqueous solution of the alkaline salt of 2-mercaptobenzothiazole.

3,904,639
THIAZOLOTRIAZOLYPHOSPHONOTHIOATES

Saburo Kano; Osami Nomura, both of Odawara; Mitsuo Asada, Hiratsuka; Meiki Ando; Michihiko Matsuda, both of Kanagawa; Tomio Yamada; Hitoshi Watanabe, both of Hiratsuka, and Takuzo Taniguchi, Kamakura, all of Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan

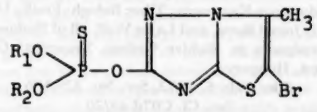
Filed Dec. 29, 1972, Ser. No. 319,490

Claims priority, application Japan, Dec. 30, 1971, 47-3186

Int. Cl.² C07D *513/04*

U.S. Cl. 260—306.7 E **2 Claims**

1. A compound represented by the formula:



wherein R_1 and R_2 are each selected from the group consisting of methyl and ethyl.

3,904,640
5-(T-BUTYL-1,3,4-THIADIAZOL-2-YL)-3-METHYL-5-HYDROXYIMIDAZOLIDIN-2-ORE

John Krenzer, Oak Park, Ill., assignor to Velsicol Chemical Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 383,417, July 27, 1973, abandoned. This application Feb. 11, 1974, Ser. No. 441,721

Int. Cl.² C07D *417/04*

U.S. Cl. 260—306.8 D **1 Claim**

1. The compound 1-(5-t-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-hydroxy-1,3-imidazolidin-2-one.

3,904,641

TRIAZOLOTHIENODIAZEPINE COMPOUNDS

Michio Nakanishi, Oita; Tetsuya Tahara, Fukuoka; Kazuhiko Araki, Fukuoka, and Masami Shiroki, Fukuoka, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed June 12, 1972, Ser. No. 261,757

Claims priority, application Japan, June 18, 1971, 46-44288; June 21, 1971, 46-45011; June 30, 1971, 46-48336; July 8, 1971, 46-50911; July 10, 1971, 46-51211; July 13, 1971, 46-52242

Int. Cl.² C07D *495/04, 495/14*

U.S. Cl. 260—308 R 8 Claims

1. The compound:
6-o-chlorophenyl-8-ethyl-4H-s-triazolo[3,4-c]thieno[2,3-e][1,4]diazepine.

3,904,642

BENZIMIDAZOLYL COUMARINE FLUORESCENT DYES

Wolfgang Mach, Hockenheim, and Horst Scheuermann, Ludwigshafen, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

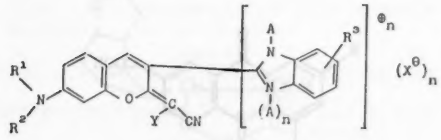
Filed Sept. 5, 1972, Ser. No. 286,416

Claims priority, application Germany, Sept. 7, 1971, 2144591

Int. Cl.² C07D *235/18*

U.S. Cl. 260—309.2 9 Claims

1. A fluorescent dye of the formula



wherein:

R^1 is hydrogen; alkyl of one to four carbon atoms which may bear methoxy, ethoxy, chlorine, bromine, carboxyl, carbalkoxy of 1 to 4 carbon atoms in the alkoxy portion, carbamoyl or acetoxy; cyclohexyl, benzyl or phenyl;

R^2 is hydrogen; alkyl of one to four carbon atoms which may bear as a substituent methoxy, ethoxy, chlorine, bromine, carboxyl, carbalkoxy of 1 to 4 carbon atoms in the alkoxy portion, carbamoyl or acetoxy;

Y is carbalkoxy of 1 to 4 carbon atoms in the alkoxy portion; unsubstituted carbamoyl; N-alkyl- or N,N-dialkylcarbamoyl of a total of up to 8 carbon atoms in the alkyl portions; phenylcarbamoyl; cyclohexylcarbamoyl; benzylcarbamoyl; or cyano;

A is hydrogen, methyl, ethyl, β-hydroxyethyl or β-hydroxypropyl;

R^3 is hydrogen or methyl;

n is zero or 1; and

X^- is an anion.

3,904,643

BENZIMIDAZOL-2-YL-CARBAMIC ACID KETONOXIME ESTERS

Werner Daum, Krefeld-Bockum; Paul-Ernst Frohberger, Leverkusen, and Brigitte Hamburger, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

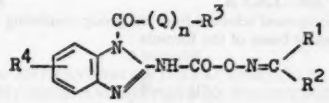
Filed May 24, 1973, Ser. No. 363,672

Claims priority, application Germany, June 8, 1972, 2227920

Int. Cl.² C07D *235/32*

U.S. Cl. 260—309.2 8 Claims

1. A substituted benzimidazol-2yl-carbamic acid ketonoxime ester of the formula



in which

R^1 and R^2 each independently is alkyl of up to 5 carbon atoms, or phenyl, or R^1 and R^2 together are alkylene of 4 to 10 carbon atoms,

R^3 is alkyl of up to 5 carbon atoms, phenyl, mono-halophenyl, di-halophenyl mono-chloro-lower alkyl or mono-cyano-lower alkyl,

R^4 is hydrogen or lower alkyl,

Q is —O—, —NH— or

R^5 is alkyl with up to 5 carbon atoms or phenyl, and *n* is 0 or 1.

3,904,644

PERFLUOROALKYLMONOCARBOXYLIC ACID ESTERS CONTAINING N,N'-DISUBSTITUTED HYDANTOIN GROUPS AND GLYCIDYL GROUPS

Horst Jaeger, Bettingen, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

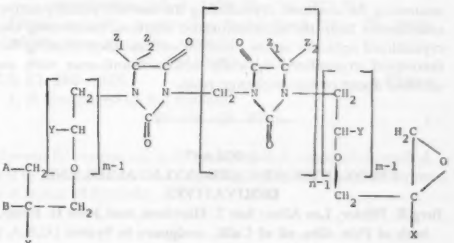
Division of Ser. No. 95,340, Dec. 4, 1970, abandoned. This application Sept. 6, 1972, Ser. No. 286,797

Claims priority, application Switzerland, Dec. 10, 1969, 18400/69; Feb. 9, 1970, 1827/70

Int. Cl.² C07D *233/72*

U.S. Cl. 260—309.5 12 Claims

1. Perfluoroalkylmonocarboxylic acid esters which correspond to the formula



in which

one of A and B is —OH and the other is $RE_{(n-1)}COO$—,

R represents perfluoroalkyl with 4 to 14 carbon atoms,

E represents cyclopentylene or cyclohexylene or n-alkylene with 1 to 10 carbon atoms,

X and Y each represent hydrogen or methyl,
m, *n* and *x'* each are 1 or 2, and
Z_1 and Z_2 each denote hydrogen or alkyl with 1 to 4 carbon atoms.

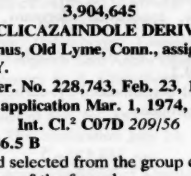
3,904,645

TRICYCLICAZAINDOLE DERIVATIVES

James M. McManus, Old Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 228,743, Feb. 23, 1972, Pat. No. 3,833,591. This application Mar. 1, 1974, Ser. No. 447,074
Int. Cl.[2] C07D *209/56*
U.S. Cl. 260—326.5 B **3 Claims**

1. A compound selected from the group consisting of tricyclicazaindole bases of the formula



and the pharmaceutically acceptable acid addition salts thereof, wherein R_1 and R_2 are each a member selected from the group consisting of hydrogen, 8-methoxy and 10-methoxy *n* is 3 and R_3 is a member selected from the group consisting of alkyl having from 1 to 6 carbon atoms, cycloalkyl having from 3 to 6 carbon atoms, phenylalkyl having up to 3 carbon atoms in the alkyl moiety, phenyl, chlorophenyl, tolyl, anisyl and thienyl.

3,904,646

RESOLUTION OF TRYPTOPHAN USING BENZENESULFONIC ACID AND P-PHENOLSULFONIC ACID

Ichiro Chibata, Suita; Shigeki Yamada, Toyonaka; Masao Yamamoto, Hirakata, and Hisato Sanematsu, Osaka, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Sept. 17, 1973, Ser. No. 398,188
Claims priority, application Japan, Sept. 28, 1972, 47-97874; Mar. 27, 1973, 48-35370
Int. Cl.[2] C07D *209/20*
U.S. Cl. 260—326.14 T **27 Claims**

24. The process for preparing optically active tryptophan which comprises the steps of adding one of optically active enantiomer of tryptophan benzenesulfonate or tryptophan p-phenolsulfonate to an aqueous solution of DL-tryptophan benzenesulfonate or DL-tryptophan p-phenolsulfonate, supersaturating the solution, crystallizing the one of optically active enantiomer from the supersaturated solution, recovering the crystallized optically active enantiomer, and then treating the recovered crystallized optically active enantiomer with an alkaline agent or ion-exchange resin.

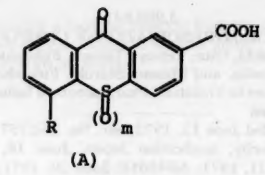
3,904,647

THIOXANTHONE CARBOXYLIC ACIDS AND DERIVATIVES

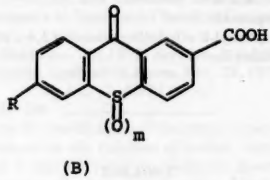
Jurg R. Pfister, Los Altos; Ian T. Harrison, and John H. Fried, both of Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 273,290, July 19, 1972. This application Nov. 21, 1972, Ser. No. 308,569
Int. Cl. C07d *65/18*
U.S. Cl. 260—328 **23 Claims**

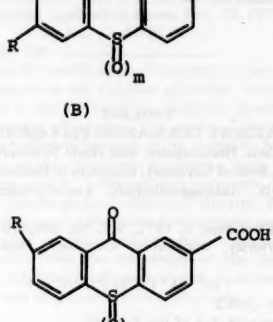
1. A compound selected from those represented by the following formulas:



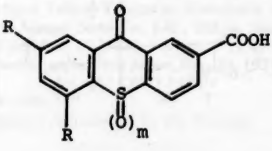
(A)



(B)

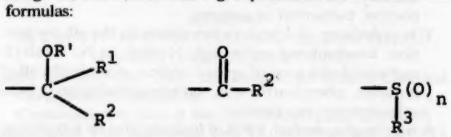


(C)



(D)

or a pharmaceutically acceptable, non-toxic lower straight or branched chain alkyl containing one to five carbon atoms or glycerol ester, unsubstituted, monolower alkyl, dilower alkyl, dilower alkylamino lower alkyl, lower alkoxy lower alkyl, in which the lower alkyl or lower alkoxy moiety is straight or branched chain containing one to five carbon atoms, or phenethyl substituted amide or salt thereof; wherein each m is the integer 0, 1 or 2, each R is a group selected from those of the formulas:



in which R' is hydrogen, lower straight or branched chain alkyl containing one to five carbon atoms, cycloalkyl containing three to six carbon atoms, tetrahydrofuran-2-yl, tetrahy-

dropyran-2-yl, tetrahydropyran-4-yl, 4-lower alkoxytetrahydropyran-4-yl in which the lower alkoxy moiety is straight or branched chain containing one to five carbon atoms, or alkanoyl containing up to 4 carbon atoms; R^1 is hydrogen, lower straight or branched chain alkyl containing one to five carbon atoms, or cycloalkyl containing three to six carbon atoms; R^2 is hydrogen, lower straight or branched chain alkyl containing one to five carbon atoms, cycloalkyl containing three to six carbon atoms; phenyl, substituted phenyl (in which the substituent is halo, lower straight or branched chain alkyl containing one to five carbon atoms, lower straight or branched chain alkoxy containing one to five carbon atoms, lower straight or branched chain alkylthio containing one to five carbon atoms, trifluoromethyl, or cyano), or a monocyclic aromatic heterocyclic group having five or six total members, one or two of which are selected from nitrogen, oxygen, and sulfur, selected from pyridyl, pyridazinyl, pyrimidinyl, pyrazinyl, pyrazolyl, imidazolyl, furanyl, thienyl, pyrrolyl, isoxazolyl, and oxazolyl; n is the integer 1 or 2; R^3 is lower straight or branched chain alkyl containing one to five carbon atoms when n is 1 and R^3 is lower straight or branched chain alkyl containing one to five carbon atoms, hydroxy, amino, monolower (straight or branched chain) alkylamino containing one to five carbon atoms, or dilower alkylamino in which each lower alkyl group is straight or branched chain containing one to five carbon atoms when n is 2.

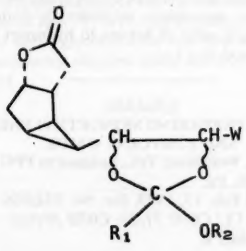
3,904,648

CYCLIC ORTHO ESTERS

Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed June 28, 1973, Ser. No. 374,349
Int. Cl.[2] C07D *317/30*
U.S. Cl. 260—340.9 **8 Claims**

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein R_1 is hydrogen alkyl of one to 19 carbon atoms, inclusive, benzyl or 2,4-dichlorobenzyl; R_2 is methyl or ethyl; W is 1-pentyl, cis-1-pent-2-enyl, or 1-pent-2-ynyl, and ~ indicates attachment to the side chain in alpha or beta configuration.

3,904,649

PROCESS FOR PRODUCING SUBSTITUTED IODOLACTONE

Ned M. Weinshenker, Palo Alto, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Filed Nov. 17, 1971, Ser. No. 199,719
Int. Cl.[2] C07D *307/77*
U.S. Cl. 260—343.3 **1 Claim**

1. A process for preparing (±)2-oxa, 3-oxo,6-exo-methoxymethyl,7-endo-hydroxy,8-exo-iodo-cis-bicyclo-(3.3.0) octane wherein the process consists essentially of oxidizing 7-syn-methoxymethyl-2-norbornen-5-one with hydrogen peroxide in an alkaline medium for about ½ hour to 4 hours, acidifying the medim to a pH of about 5 to 7 and quenching the unused hydrogen peroxide with a reducing agent selected from the group consisting of sodium sulfite, potassium sulfite, lithium sulfite, calcium sulfite, ferrous chloride, and ferrous sulfate, realkalizing the medium and treating it with a solution comprised of an alkali iodide and iodine in the ratio of about 3 to 1, at a temperature of about 0° to 15°C, decolorizing the unreacted solution with a reducing agent, and extracting the decolorized solution with an inert organic solvent to yield the γ-lactone, and wherein the process is continuous and performed in a single reaction vessel for producing the γ-lactone.

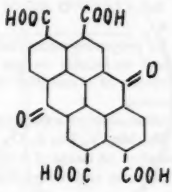
3,904,650

3,4,9,10-ANTHANTHRONETETRACARBOXYLIC ACID, ITS ANHYDRIDE AND METHOD OF PRODUCING SAME

Nikolai Stepanovich Dokunikhin, Presnensky val, 42, kv. 23; Georgy Nikolaevich Vorozhtsov, Sadovaya - Spasskaya ulitsa, 21, kv. 268, and Valentina Petrovna Sarycheva, Varshavskoe Shosse, 188, korpus 1, kv. 36, all of Moscow, U.S.S.R.

Filed May 4, 1973, Ser. No. 357,275
Int. Cl. C07d *311/02;* **C07c** *63/00*
U.S. Cl. 260—345.2 **4 Claims**

1. 3,4,9,10-anthanthronetetracarboxylic acid of the formula



and the anhydride thereof.

3,904,651

ORGANO PEROXIDES

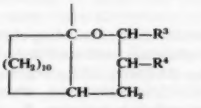
Joseph J. Becker, Geneva, Switzerland, assignor to Firmenich SA, Geneva, Switzerland

Division of Ser. No. 41,595, May 28, 1970, abandoned. This application July 9, 1973, Ser. No. 377,566
Claims priority, application Switzerland, May 29, 1969, 8192/69; May 27, 1970, 7865/70
Int. Cl.[2] C07D *311/94*
U.S. Cl. 260—345.2 **6 Claims**

1. A compound of the formula

$$R^1—O—O—R^2 \qquad \text{I}$$

wherein R^1 represents hydrogen, an alkyl, cycloalkyl, aralkyl, aryl or acyl radical each containing from 1 to 7 carbon atoms or a group of formula



II

and R^2 represents a group of formula II, provided that when R^1 and R^2 represent a group of formula II they are identical.

3,904,652

RECYCLE PROCESS FOR OXIDATION OF N-BUTANE TO MALEIC ANHYDRIDE

Marshall E. Frank, Ossining, N.Y., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Nov. 16, 1972, Ser. No. 307,038
Int. Cl.[2] C07D 307/60
U.S. Cl. 260—346.8 9 Claims

1. In a process for the preparation of maleic anhydride wherein n-butane is oxidized in a reaction zone in the presence of a phosphorous--vanadium--oxygen complex catalyst containing one or more metal activators selected from the group consisting of zinc, copper, bismuth and lithium, the improvement which comprises: maintaining, in the reaction zone, the n-butane concentration above 1.7% of the feed, the oxygen concentration from 3–13% and the inert gas concentration from 70–95%; converting from 30 to 70% of the n-butane; withdrawing a reactor effluent from said reaction zone containing maleic anhydride, oxides of carbon and unreacted butane; separating the maleic anhydride; and recycling a major portion of the remaining reactor effluent to the reaction zone.

3,904,653

SYNTHESIS OF MALEIC ANHYDRIDE

Ernest C. Milberger, Solon, and Serge R. Dolhyj, Parma, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed May 5, 1972, Ser. No. 250,660
Int. Cl.[2] C07D 307/60
U.S. Cl. 260—346.8 10 Claims

1. In the process for preparing maleic anhydride by contacting 1,3-butadiene and molecular oxygen with an oxidation catalyst at a temperature of about 250° to about 600°C. the improvement comprising:

using as the oxidation catalyst a catalyst containing

$$Sb_a\ Mo_b\ V_c\ Fe_d\ Z_e\ O_x$$

wherein Z is a metal or an oxide of molybdenum, tungsten, magnesium, aluminum and nickel and

wherein

a and *b* are numbers from about 1 to about 9,

c, *d* and *e* are numbers from 0 to about 1,

$c + d$ is not zero and

x is a number which satisfies the valence requirements of the other elements present

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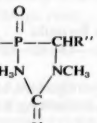
3,904,654

UREA-PHOSPHORUS COMPOUNDS

Gail H. Birum, Kirkwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed Aug. 6, 1973, Ser. No. 385,933
Int. Cl. C07d 105/02, 5/14
U.S. Cl. 260—347.2 3 Claims

1. Process for the preparation of



where

R′ is selected from the group consisting of phenyl, tolyloxy, chloroethoxy, phenoxy, and naphthyl, R″ is selected from the group consisting of hydrogen, furyl, alkyl or alkenyl of 1 to 15 carbon atoms, phenyl, and phenyl substituted with chlorine, bromine, fluorine, cyano, hydroxy or methoxy, and Y is O or S, which comprises heating $CH_3NHC(Y)NHCH_3$, R″CHO and $(RO)_2PR$ in an inert solvent where R is aryl or chloroalkyl of 2 to 10 carbon atoms.

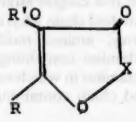
3,904,655

PROCESS FOR THE PREPARATION OF A FLAVOR SUBSTANCE BY REACTING A 4-OXY-5-ALKYL-3-FURANONE WITH A HYDROGEN SULFIDE LIBERATING SUBSTANCE

Godefridus Antonius Maria van den Ouweland, and Henricus Gerardus Peer, both of Zevenaar, Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Division of Ser. No. 836,968, June 26, 1969, Pat. No. 3,697,295. This application Dec. 13, 1971, Ser. No. 207,671
Int. Cl. C07d 5/10
U.S. Cl. 260—347.8 4 Claims

1. A process for the preparation of a flavor substan comprising reacting at a temperature of 0°–150°C a heterocyclic ketone having the structure:



where X is selected from the groupings:

CH_2, $CHCH_3$, $CHCH_2CH_3$ or $CHCH_2OH$,

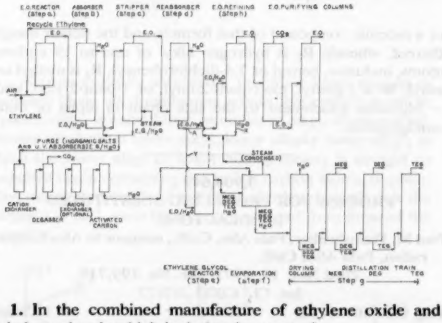
and where R is a radical selected from the group consisting of alkyl radicals having from 1 to 4 carbon atoms, and where R^1 is a radical selected from the group consisting of hydrogen, a hydrocarbon acyl radical having from 2 to 7 carbon atoms and an alkyl radical having from 1 to 4 carbon atoms, in the presence of water with a hydrogen sulphide liberating compound selected from the group consisting of hydrogen sulphide, cysteine, cysteine containing peptide, cystine mercaptoacetamide, thiocetamide, their salts or esters, alkali metal, alkaline earth metal and ammonium sulphides or hydrosulphides wherein the weight ratio of ketone to hydrogen sulphide is between 1 : 10 and 10 : 1.

3,904,656

PROCESS FOR PREPARING MONOETHYLENE GLYCOL AND ETHYLENE OXIDE

Stephen E. Broz, Beaumont, Tex., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 13, 1973, Ser. No. 332,056
Int. Cl.[2] C07C 31/20; C07D 301/32
U.S. Cl. 260—348.5 R 3 Claims



1. In the combined manufacture of ethylene oxide and ethylene glycols which includes the steps of:

a. reacting oxygen and ethylene in a reactor in the presence of a catalyst at elevated temperatures to produce ethylene oxide;

b. absorbing ethylene oxide produced in step (a) in water in an absorber to produce an ethylene oxide-water stream;

c. stream stripping ethylene oxide from the ethylene oxide-water stream produced in step (b) in a stripping column to produce an ethylene oxide overhead stream and an aqueous bottoms stream and recycling aqueous bottoms from the stripping column to the absorber of step (b);

d. reabsorbing stripped ethylene oxide from step (c) in water in a reabsorbing column to provide an ethylene oxide-water stream;

e. forwarding to a glycol reactor a portion of the ethylene oxide-water stream produced in step (d) and reacting ethylene oxide contained therein with water to produce a product stream comprising ethylene glycols in water;

f. evaporating water from the product stream produced in step (e) in an evaporator to produce a glycols product stream, and recycling evaporated water to the reabsorbing column of step (d);

g. distilling the glycols product stream produced in step (f) to produce a monoethylene glycol product; and

h. distilling a portion of the ethylene oxide-water stream produced in step (d) in an ethylene oxide refining column to provide an overhead ethylene oxide product stream an an aqueous bottoms stream, and recycling aqueous bottoms from the refining column to the reabsorbing column of step (d);

the improvement which comprises (1) removng as a purge stream a portion of the recycled aqueous bottoms from the stripping column of step (c), said portion being sufficient to maintain the water balance in the absorbing column-stripping column system of steps (b) and (c), (2) treating purge stream water with cation exchange materials to remove inorganic salts therefrom, degassing the purge stream water, and contacting ion exchange-treated purge stream water with activated carbon to remove ultraviolet light absorbers therefrom, (3) forwarding thus treated purge stream water to the reabsorber of step (d) or the evaporator of step (f) or both, and (4) maintaining the volumetric ratio of (i) aqueous bottoms from the refining column of step (h) recycled to the reabsorbing column of step (d) to (ii) the ethylene oxide-water stream forwarded to the glycol reactor at a value not greater than 6, thereby producing ethylene oxide and fiber grade monoethylene glycol.

3,904,657

10,11-EPOXIDES OF PGA_2 AND ITS 15-ACETYL AND -SILYL DERIVATIVES

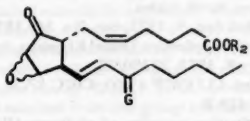
John E. Pike, and William P. Schneider, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 159,478, July 2, 1971, Pat. No. 3,772,350, which is a continuation-in-part of Ser. No. 71,390, Sept. 11, 1970, abandoned. This application Oct. 3, 1973, Ser. No. 403,095

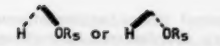
Int. Cl.² C07D *303/40*

U.S. Cl. 260—348 C **10 Claims**

1. A compound of the formula:



wherein R_2 is hydrogen or methyl, wherein G is



wherein R_5 is hydrogen, acetyl, or —Si—$(A)_3$ wherein A is alkyl of one to 4 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one or 2 fluoro, chloro, or alkyl of one to 4 carbon atoms, inclusive, and wherein

indicates attachment of the epoxide oxygen to the ring in alpha or beta configuration.

3,904,658

N,N'-DIGLYCIDYL-DICARBOXYLIC ACID DIANILIDES

Hans Batzer, Arlesheim; Juerger Habermeier, Pfeffingen, and Daniel Porret, Binningen, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

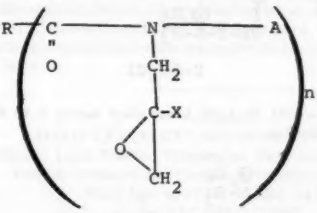
Division of Ser. No. 183,234, Sept. 23, 1971, Pat. No. 3,798,242. This application Dec. 20, 1973, Ser. No. 426,779

Claims priority, application Switzerland, Sept. 25, 1970, 14268/70

Int. Cl.² C07D *303/46*

U.S. Cl. 260—348 A **5 Claims**

1. A polyglycidyl compound having the formula



(I)

wherein R is alkylene of 2 to 18 carbon atoms; A is phenyl or a phenyl substituted with at least one methyl, methoxy, trifluoromethyl or nitro group; and X is methyl or hydrogen.

3,904,659

PRODUCTION OF PURE 1-NITROANTHRAQUINONE

Karl-Heinz Bantel, Ludwigshafen, and Heinz Eilingsfeld, Frankenthal, both of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen, Germany

Filed Oct. 29, 1973, Ser. No. 410,367

Claims priority, application Germany, Oct. 31, 1972, 2253276

Int. Cl.² C07C *79/37*

U.S. Cl. 260—369 **6 Claims**

1. A process for the production of pure 1-nitroanthraquinone from a nitroanthraquinone mixture containing at least 60 percent by weight of 1-nitroanthraquinone which comprises treating the mixture in from one-half to ten times the amount of the nitroanthraquinone mixture of an aprotic polar organic solvent which may contain up to 10 percent by weight of water in the presence of from 0.1 to 10 percent by weight based on the nitroanthraquinone mixture of an initiator selected from the group consisting of alkali metal nitrite, alkaline earth metal nitrite, alkali metal thiocyanate, alkali metal and alkaline earth metal halides with 0.5 to 2 moles, per mole dinitro compound in the nitroanthraquinone mixture, of a compound having at least one activated —CH_2— group and which is selected from the group consisting of methyl ethyl ketone, diethyl ketone, methyl propyl ketone, ethyl propyl ketone, dipropyl ketone, methyl butyl ketone, ethyl butyl ketone, propyl butyl ketone, dibutyl ketone, isopropyl ethyl ketone,

isopropyl propyl ketone, cyclopentanone, cyclohexanone, cyclooctanone, acetylacetone, benzoylacetone, ethyl acetoacetate, acetoacetanilide, diethyl malonate, acetophenone, propiophenone and 3-methyl-1-phenylpyrazolone-5 at a temperature of from 70° to 150°C, cooling the mixture after completion of the reaction and separating the purified 1-nitroanthraquinone from the reaction mixture.

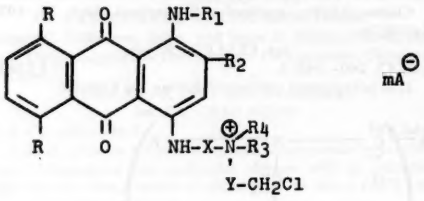
3,904,660

CATIONIC ANTHRAQUINONE DYES

Nagib A. Doss, Williamsville, N.Y., assignor to Allied Chemical Corporation, New York, N.Y.

Filed Dec. 15, 1972, Ser. No. 315,737
Int. Cl.² C09B *1/28, 1/50*
U.S. Cl. 260—380 **13 Claims**

1. A cationic dye having the formula



wherein R is H or OH, R_1 is H, lower alkyl having 1 to 4 carbon atoms, phenyl or

R_2 is H, lower alkyl having 1 to 4 carbon atoms, chlorine or bromine, R_3 and R_4 are lower alkyl having 1 to 4 carbon atoms, or together form a morpholino, pyrrolidino or piperidino group, X is alkylene or alkarylene of 1 to 10 carbon atoms, Y is $(CH_2)_n$—Q wherein Q is a divalent alkene radical of 2 to 5 carbon atoms or phenylene, *n* is an integer of 1 to 4, *m* is an integer equal to the number of positively charged nitrogen atoms and A is an anion.

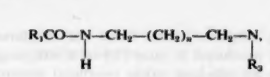
3,904,661

SURFACE ACTIVE MEANS, THEIR MANUFACTURE AND USE

Günter Pusch, Leitershofen, Germany, assignor to Chemische Fabrik Pfersee G.m.b.H., Augsburg, Germany

Filed Dec. 26, 1972, Ser. No. 318,038
Claims priority, application Germany, Dec. 28, 1971, 2165018; Aug. 25, 1972, 2241845
Int. Cl.² C07C *103/00*
U.S. Cl. 260—404.5 **5 Claims**

1. Process for producing fatty acid amides containing polyglycol ether residues comprising reacting fatty acid amides of the general formula A—H, wherein A is n



R_1 is a saturated or singly unsaturated alkyl residue which can also contain a hydroxyl group with 9 to 17 C-atoms, R_3 is a low alkyl residue with 1 to 4 carbon atoms, $—CH_2CH_2OH$, $—CH_2CH(OH)CH_3$ *n* is 0 or 1 with chlorohydrin ethers C, said chlorohydrin ethers C having been produced by reacting 1 mol polyglycol of the formula $H(OCH_2CH_2)_mOH$, wherein m is 6 to 30 with 1 to 1.4 mol epichlorohydrin is usual manner, said fatty acid amides being reacted in the presence of acid-binding means in a mol ratio 1:1 and finally adjusting the produced reaction product by the addition of acids or bases to a pH value of 3 to 10.

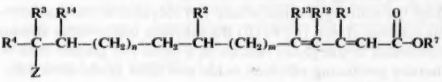
3,904,662

2,4-DIENOIC ACIDS, ESTERS AND DERIVATIVES

Clive A. Henrick, and John B. Siddall, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 224,261, Feb. 7, 1972, abandoned, which is a continuation-in-part of Ser. No. 206,174, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 187,897, Oct. 8, 1971, Pat. No. 3,755,411, which is a continuation-in-part of Ser. Nos. 111,650, Feb. 1, 1971, Pat. No. 3,729,486, Ser. No. 111,702, Feb. 1, 1971, abandoned, Ser. No. 111,765, Feb. 1, 1971, abandoned, Ser. No. 111,766, Feb. 1, 1971, abandoned, Ser. No. 111,770, Feb. 1, 1971, abandoned, and Ser. No. 115,725, Feb. 16, 1971, Pat. No. 3,706,733. This application June 19, 1972, Ser. No. 263,903
Int. Cl. C07c *69/66, 69/52;* A01n *9/24*
U.S. Cl. 260—410 **36 Claims**

1. A compound selected from those of the formula:



wherein,

each of *m* and *n* is zero or the positive integer one, two or three;

Z is bromo, chloro, fluoro or the group —OR in which R is hydrogen, lower alkyl of one to six carbon atoms or hydrocarbon carboxylic acyl of one to three carbon atoms;

each of R^1 and R^2 is methyl or ethyl;

R^3 is hydrogen, methyl or ethyl;

R^4 is lower alkyl of one to six carbon atoms;

each of R^{12}, R^{13} and R^{14} is hydrogen or methyl; and

R^7 is hydrogen, lower alkyl of one to six carbon atoms, lower alkenyl of two to six carbon atoms, lower alkynyl of three to six carbon atoms, cycloalkyl of three to eight carbon atoms, aryl of six to 12 carbon atoms, aralkyl of seven to 12 carbon atoms or a metal cation selected from the group consisting of lithium, sodium, potassium, calcium, strontium, copper, manganese and zinc.

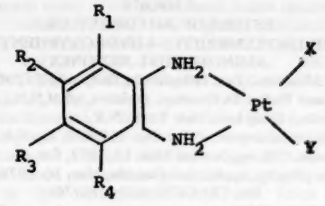
3,904,663

COMPOSITIONS CONTAINING PLATINUM

Martin Leslie Tobe, Northwood; Abdul Rauf Khokhar, London, and Peter David Michael Braddock, Wigan, all of England, assignors to Rustenburg Platinum Mines Limited, Johannesburg, South Africa

Filed Apr. 9, 1973, Ser. No. 349,187
Claims priority, application United Kingdom, Apr. 10, 1972, 16451/72; May 8, 1972, 21390/72
Int. Cl.² C07F *15/00;* C07C *87/58*
U.S. Cl. 260—429 R **6 Claims**

1. A co-ordination complex of platinum (II) having the structure:



in which R_1 and R_4 are hydrogen, R_2 and R_3 are either both hydrogen or both lower alkyl and X and Y are halogen.

3,904,664

INHIBITING PREMATURE VULCANIZATION OF RUBBERS

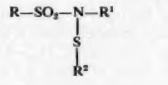
James R. Shelton, East Cleveland, and Roger J. Hopper, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 26,431, April 7, 1970, Pat. No. 3,678,017. This application Nov. 16, 1971, Ser. No. 199,381

Int. Cl.² C07C *119/18, 119/20*

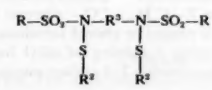
U.S. Cl. 260—453 R **5 Claims**

1. A compound selected from the group consisting of compounds having the following structural formulae:



(I)

and



(II)

wherein R is selected from the group consisting of alkyl radicals having from 1 to 20 carbon atoms, cycloalkyl radicals having from 5 to 20 carbon atoms, phenylalkyl radicals having from 7 to 20 carbon atoms, chloroalkyl radicals having from 1 to 20 carbon atoms, phenyl, alkylphenyl radicals having from 7 to 20 carbon atoms, chlorophenyl radicals, nitrophenyl radicals, alkoxyphenyl radicals having from 7 to 20 carbon atoms. and

wherein R^1 is selected from the group consisting of alkyl radicals having from 1 to 20 carbon atoms, cycloalkyl radicals having from 5 to 20 carbon atoms, phenyl, alkylphenyl radicals having from 7 to 20 carbon atoms, chlorophenyl radicals, nitrophenyl radicals and alkoxyphenyl radicals having from 7 to 20 carbon atoms, wherein R^2, R^4 and R^5 are selected from the group consisting of alkyl radicals having from 1 to 20 carbon atoms, cycloalkyl radicals having from 5 to 20 carbon atoms, phenylalkyl radicals having from 7 to 20 carbon atoms, chloroalkyl radicals having from 1 to 20 carbon atoms, phenyl, alkylphenyl radicals having from 7 to 20 carbon atoms, chlorophenyl radicals, nitrophenyl radicals and alkoxyphenyl radicals having from 7 to 20 carbon atoms and wherein R^3 is selected from the group consisting of alkylene radicals having 1 to 6 carbon atoms and cycloalkylene radicals having 5 to 7 carbon atoms.

3,904,665

1-ISOCYANATO-2-ISOCYANATOMETHYL-CYCLOPENTANE

Jean-Pierre Decor, and Jean Goletto, both of Rhone, France, assignors to Rhone-Poulenc S.A., Paris, France

Filed Oct. 19, 1973, Ser. No. 408,047

Claims priority, application France, Oct. 23, 1972, 72.37512

Int. Cl.² C07C *119/045*

U.S. Cl. 260—453 A **1 Claim**

1. 1-Isocyanato-2-isocyanatomethyl-cyclopentane.

3,904,666

TETRAISOCYANATE COMPOSITIONS

Wilhelm J. Schnabel, Branford, and Ralph A. Colafati, III, New Haven, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Nov. 15, 1973, Ser. No. 416,043

Int. Cl.² C07C *119/048*

U.S. Cl. 260—453 AM **4 Claims**

1. A composition of matter which is comprised of a combination of (a) bis(diisocyanatobenzyl)chlorobenzene and (b) diisocyanatophenyl-chlorophenylmethane in a weight ratio, (a):(b), ranging from about 15:85 to about 60:40, said combination being selected from the group consisting of a combination of bis(2,4-diisocyanatobenzyl)chlorobenzene and 2,4-diisocyanatophenyl-chlorophenylmethane, a combination of bis(2,6-diisocyanatobenzyl)-chlorobenzene and 2,6-diisocyanatophenyl-chlorophenylmethane, a combination of bis(2,5-diisocyanatobenzyl)-chlorobenzene and 2,4-diisocyanatophenyl-chlorophenylmethane, a combination of bis(3,5-diisocyanatobenzyl)-chlorobenzene and 3,5-diisocyanatophenyl-chlorophenylmethane, and a mixture thereof.

3,904,667

4-HALO-2,5-DIALKYL-BENZENEACETONITRILES

Elmore Louis Martin, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 6, 1972, Ser. No. 241,836

Int. Cl.² C07C *121/66*

U.S. Cl. 260—465 G **3 Claims**

1. The compound 4-bromo-2,5-diisopropylbenzeneacetonitrile.

2. The compound 4-bromo-2-tert-butyl-5-isopropylbenzeneacetonitrile.

3. The compound 4-chloro-2,5-diisopropylbenzeneacetonitrile.

3,904,668

PROCESS FOR PREPARING IMINODIACETONITRILE AND ALKALI METAL IMINODIACETATES

Roger R. Gaudette; James E. Philbrook, both of Nashua, and Jon C. Thunberg, Amherst, all of N.H., assignors to W. R. Grace & Co., New York, N.Y.

Filed Nov. 15, 1973, Ser. No. 416,026

Int. Cl.² C07C *120/00*

U.S. Cl. 260—465.5 A **30 Claims**

1. a process for preparing iminodiacetonitrile comprising:

a. preparing an aqueous mixture of hexamethylenetetramine, HCN, and glycolonitrile having a mole ratio of hexamethylenetetramine to HCN to glycolonitrile of 1:5.2–6.6:1.8–2.2 by feeding the HCN into an aqueous mixture of the hexamethylenetetramine and formaldehyde in a mixing and reacting zone while maintaining the temperature within the mixing and reacting zone at 10°–50°C until one-fourth of the HCN is added and then adding the remaining three-fourths of the HCN while maintaining the temperature within the mixing and reacting zone at 0°–30°C, the pH of the aqueous mixture of hexamethylenetetramine, HCN, and glycolonitrile in the mixing and reacting zone being 4–10;

b. preparing an aqueous system containing the iminodiacetonitrile by passing the aqueous mixture of hexamethylenetetramine, HCN, and glycolonitrile through a tubular reaction zone while maintaining the temperature within the tubular reaction zone at 50°–200°C, residence time in the tubular reaction zone being 0.1–20 minutes, and

c. recovering the iminodiacetonitrile exit the tubular reaction zone.

3,904,669

N-ACYL BISCARBAMATE HERBICIDES

Gerhard Boroschewski, Berlin, and Friedrich Arndt, Aich, both of Germany, assignors to Schering Aktiengesellschaft, Berlin, Germany

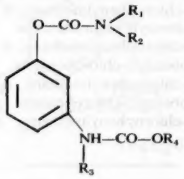
Filed Feb. 11, 1972, Ser. No. 225,626

Claims priority, application Germany, Feb. 16, 1971, 2108975

Int. Cl.[2] C07C *125/06*

U.S. Cl. 260—471 C **41 Claims**

1. Herbicidal compounds having the formula



wherein R_1 can be hydrogen, an alkanoyl radical of from 1 to 6 carbons, alkyl of from 2 to 5 carbons, or cyclohexyl; R_2 can be hydrogen, alkyl of from 2 to 8 carbons, phenyl, chlorophenyl, methylphenyl, or ethylphenyl; R_3 is an alkanoyl radical of from 1 to 6 carbons; and R_4 is methyl or ethyl.

3,904,670

BUTACAINE PAMOATE

Rene' Ricard; Miguel Margarit Taya', and Dionisio Martin Aedo, all of Barcelona, Spain, assignors to Rocador Sociedad Anonima, Barcelona, Spain

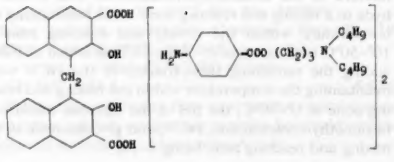
Filed Jan. 8, 1974, Ser. No. 431,810

Claims priority, application Spain, Jan. 18, 1973, 410734

Int. Cl.[2] C07C *101/056*

U.S. Cl. 260—472 **1 Claim**

1. Butacaine pamoate having the following structure:



3,904,671

ESTERS OF 3-HYDROXY(OR HYDROXYMETHYL)-4-HYDROXYPHENYL AMINOMETHYL KETONES

Hiroaki Minatoya, East Greenbush; Benjamin F. Tullar, Chathan, and Walter D. Conway, Amherst, all of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

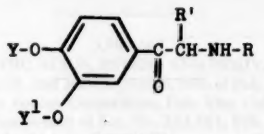
Continuation-in-part of Ser. No. 812,370, April 1, 1969, abandoned. This application Mar. 12, 1971, Ser. No. 123,834

Claims priority, application Canada, Mar. 16, 1970, 077574

Int. Cl.[2] C07C *93/20, 69/76*

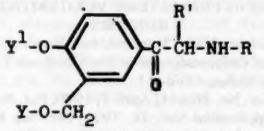
U.S. Cl. 260—473 R **27 Claims**

1. A compound of the group consisting of: 3-(Y^1-O-)-4-(Y-O-)phenyl (R-NH-)(R′)methyl ketones having the formula



Formula III

and 3-(Y-O-CH_2-)-4-(Y^1-O-)phenyl (R-NH-)(R′)methyl ketones having the formula



Formula IV

wherein, in each formula:

R is hydrogen, alkyl having 1–4 carbon atoms, or cycloalkyl having 3–6 carbon atoms;

R′ is hydrogen or alkyl having 1-3 carbon atoms;

Y^1 is hydrogen or an acyl member which is alkanoyl having 1–22 carbon atoms, cycloalkyl-C_nH_{2n}—CO— having a total of 4–10 carbon atoms of which 3-7 are ring carbon atoms in cycloalkyl and wherein *n* is zero, one, or two, 1- or 2-adamantanecarbonyl, phenoxyacetyl, naphthalenecarbonyl, or Z—C_nH_{2n}—CO— wherein *n* is zero, one or two and Z is phenyl or phenyl substituted by 1–3 members of the group consisting of alkyl having 1–4 carbon atoms, alkoxy having 1–4 carbon atoms, halo, or trifluoromethyl;

Y is one of the acyl members defined by Y^1, at least one of Y and Y^1 being Z—C_nH_{2n}—CO—; and

wherein in Formula III at least one of Y and Y^1 contains no less than four carbon atoms when R is tert-butyl or cycloalkyl and no less than seven carbon atoms when R is hydrogen or alkyl other than tert-butyl; and in Formula IV at least one of Y and Y^1 contains no less than four carbon atoms; and acid-addition salts thereof.

3,904,672

CARBOXYLATION PROCESS FOR PREPARING ALPHA UNSATURATED LINEAR FATTY ACID DERIVATIVES

John F. Knifton, Poughquag, N.Y., assignor to Texaco Inc., New York, N.Y.

Filed July 12, 1973, Ser. No. 378,728

Int. Cl.[2] C07C *69/54*

U.S. Cl. 260—486 AC **14 Claims**

1. A process of carboxylating 1-alkynes containing two to 22 carbon atoms to their linear, alpha-unsaturated fatty acid derivatives consisting essentially of:

a. admixing each molar equivalent of 1-alkyne to be carboxylated with at least a molar equivalent of hydroxylated coreactant, at least a catalytic quantity of ligand-stabil-

ized noble metal - Group IVB metal halide catalyst complex, selected from the group consisting of $PdCl_2[P(C_6H_5)_3]_2$—$SnCl_2$, $PtCl_2[As(C_6H_5)_3]_2$—$SnCl_2 \cdot 2H_2O$, $PdCl_2[P(p\text{-}CH_3\text{—}C_6H_4)_3]_2$—$SnCl_2$, $PdCl_2[P(p\text{-}CH_3OC_6H_4)_3]_2$—$SnCl_2$, $PdCl_2[P(CH_3)_2C_6H_5]$—$SnCl_2$ and $PdCl_2[P(C_6H_5)_3]_2$—$GeCl_2$ in the presence of an oxygen-free environment, to form a reaction mixture, and

b. heating said reaction mixture between about 20°C and 120°C, in the presence of at least a stoichiometric quantity of carbon monoxide at pressures ranging from about one to 200 atmospheres, until said linear alpha-unsaturated fatty acid derivatives are formed.

3,904,673
N-CARBAMOYLOXYALKYL-SUBSTITUTED DINITROANILINES

Karl Kiehs, Lamperthein; Karl-Heinz Koenig, Frankenthal, and Adolf Fischer, Mutterstadt, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

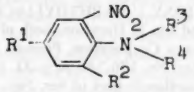
Division of Ser. No. 170,248, Aug. 9, 1971, Pat. No. 3,770,779. This application Oct. 13, 1972, Ser. No. 297,203

Claims priority, application Germany, Sept. 2, 1970, 2043442

Int. Cl.[2] C07C *125/06*

U.S. Cl. 260—482 C **5 Claims**

1. A substituted dinitroaniline of the formula



where one of the radicals R^1 and R^2 denotes nitro and the other denotes methyl, trifluoromethyl or methylsulfonyl, R^3 denotes N-methylcarbamoyloxyethyl, 2-(N-methylcarbamoyloxy) propyl, N-ethylcarbamoyloxyethyl, or 2-(N-ethylcarbamoyloxy) propyl, and R^4 has the same meanings as R^3 and may additionally denote hydrogen bromoethyl, alkylthioalkyl, or linear or branched alkyl having up to 4 carbon atoms, linear or branched alkenyl having up to 4 carbon atoms, linear or branched alkynyl having up to 4 carbon atoms, hydroxyethyl, 2-hydroxypropyl, alkoxyalkyl, or chloroethyl.

3,904,674
ENERGETIC POLYNITRO-HALOGENATED ALIPHATIC ESTERS

Milton B. Frankel, Tarzana, and Gerald L. Rowley, Albany, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 28, 1968, Ser. No. 710,704

Int. Cl. C07c *69/34, 69/36, 69/38*

U.S. Cl. 260—485 F **5 Claims**

1. Novel energetic compounds of the general formula $R[CO_2AC(NO_2)_2F]_2$ wherein R is $(CH_2)_n$ or C ≡ C and A is an alkylene of one to four carbon atoms and wherein *n* is 0 to 4.

3,904,675
NON-CATALYTIC LIQUID PHASE OXIDATION OF BUTANE

John B. Saunby, South Charleston, W. Va., assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 8, 1972, Ser. No. 232,971

Int. Cl.[2] C07C *45/02, 51/20, 67/00*

U.S. Cl. 260—488 F **6 Claims**

1. A process for the production of oxygenated products comprising acetic acid, methyl ethyl ketone, and ethyl acetate which comprises reacting n-butane and an aldehyde selected from the group consisting of saturated aliphatic aldehydes, saturated cycloaliphatic aldehydes, and aromatic aldehydes, and wherein the sole functional group in said aldehyde is formyl, in contact with a gas containing molecular oxygen, in the presence of a normally-liquid organic diluent that is a solvent for or is miscible with said aldehyde and butane, under sufficient pressure to maintain a liquid phase reaction, in the absence of a catalyst, at a temperature in the range of from about 155°C. to about 200°C., using molar ratios of aldehyde to n-butane in the range of from 1:25 to about 1:50 and molar ratios of n-butane to oxygen in the range of from about 1:1 to abaout 20:1, and conducting said reaction for a period of time sufficient to produce said oxygenated products.

3,904,676
PURIFICATION OF METHYL ACETATE

Burnell P. Curtis, Jr., Dickinson, Tex., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 26, 1973, Ser. No. 354,570

Int. Cl.[2] C07C *67/48*

U.S. Cl. 260—499 **5 Claims**

1. A process for the separation of methyl acetate and water from a mixture of methyl acetate and water which comprises the steps of extracting the methyl acetate with a hydrocarbon solvent, separating the resulting mixture into a methyl acetate-hydrocarbon extract phase and a water phase by decantation, subjecting the methyl acetate-hydrocarbon extract phase to distillation removing as overhead all traces of water therefrom, subjecting the bottoms from said distillation to fractional distillation removing pure substantially anhydrous methyl acetate overhead and removing the hydrocarbon extracting agent as bottoms and recycling said bottoms stream to said extracting step.

3,904,677
FORMATION OF SALTS OF TEREPHTHALIC ACID AND 5-METHYL-1,9-NONANEDIAMINE

Robert W. Campbell, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 22, 1972, Ser. No. 255,553

Int. Cl. C07c *87/14*

U.S. Cl. 260—501.2 **7 Claims**

1. A process for the formation of a salt of terephthalic acid and a diamine which comprises contacting said terephthalic acid and said diamine at room temperature in a medium to thereby form a slurry of said salt in said medium, cooling the thus formed slurry to promote precipitation of said salt, and filtering the thus cooled slurry to recover the precipitated salt; said medium consisting essentially of methanol and water wherein the volume ratio of methanol to water in said medium during the formation and precipitation of said salt is in the range of about 99:1 to about 80:; the weight ratio of the total of acid and diamine to said medium is in the range of about 1:1 to about 1:3; wherein at least 80 weight percent of said diamine has the formula $H_2N\text{—}R\text{—}NH_2$ wherein R is selected from the group consisting of 5-methylnonamethylene, 2,4-dimethyloctamethylene, and 2,4,6-trimethylheptamethylene, with at least 50 percent of the R's being 5-methylnonamethylene, and the balance, if any, of said diamine has the formula $R'HN\text{—}R^2\text{—}NHR'$ wherein each R′ is individually selected from the group consisting of hydrogen and alkyl radicals having from one to four carbon atoms per radical, and R^2 is a divalent hydrocarbon radical having from six to 16 carbon atoms; wherein said terephthalic acid constitutes at least 80 weight percent of the total acid present and the balance, if any, of the total acid present is a second dicarboxylic acid having the formula $HOOC\text{—}R^3\text{—}COOH$ wherein R^3 is a divalent hydrocarbon radical having from four to 14 carbon atoms.

3,904,678

OPTICAL BRIGHTENERS CONTAINING SULFONIC ACID GROUPS OF THE BIS-STYRYLBENZENE SERIES

Horst Scheuermann, Ludwigshafen; Peter-Matthias Hell, Frankenthal, and Gottfried Burkhardt, Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

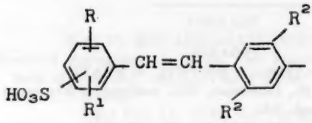
Filed May 4, 1970, Ser. No. 34,622

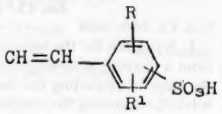
Claims priority, application Germany, May 7, 1969, 1923267

Int. Cl.² C07C *143/24*

U.S. Cl. 260—505 R 6 Claims

1. An optical brightener of the formula





wherein:

R is alkyl of 1 to 4 carbon atoms or chlorine;

R^1 is hydrogen or methyl; and

R^2 is hydrogen, chlorine or methyl

3,904,679

15-METHYL AND 15-ETHYL PROSTAGLANDIN $F_2\beta$ ANALOGS

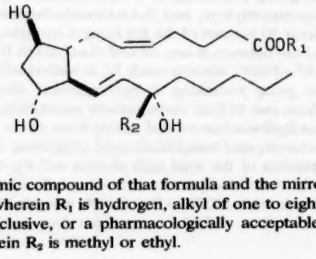
Gordon L. Bundy, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 256,175, May 23, 1972, abandoned, which is a continuation-in-part of Ser. No. 34,518, May 4, 1970, Pat. No. 3,728,382. This application Feb. 22, 1974, Ser. No. 446,198

Int. Cl.² C07C *61/38, 69/74*

U.S. Cl. 260—514 D 8 Claims

1. An optically active compound of the formula



or a racemic compound of that formula and the mirror image thereof, wherein R_1 is hydrogen, alkyl of one to eight carbon atoms, inclusive, or a pharmacologically acceptable cation, and wherein R_2 is methyl or ethyl.

3,904,680

L-3-HYDROXYMETHYLTYROSINE AND SALTS THEREOF

John T. Suh, Mequon, and Richard A. Schnettler, Brown Deer, both of Wis., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Dec. 22, 1972, Ser. No. 317,800. The portion of the term of this patent subsequent to July 23, 1991, has been disclaimed.

Int. Cl.² C07C *101/08*

U.S. Cl. 260—519 2 Claims

1. A compound selected from L-3-hydroxymethyltyrosine and its pharmaceutically acceptable salts.

3,904,681

PROPIONIC ACID

Kurt Eichenberger, Therwil, and Christian Egli, Magden, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 129,639, March 30, 1971, abandoned. This application Feb. 7, 1974, Ser. No. 440,404

Int. Cl.² C07C *101/08*

U.S. Cl. 260—519 1 Claim

1. (+)-β-Amino-β-(3,4-dimethoxy-phenyl)-propionic acid, or a therapeutically usable salt thereof.

3,904,682

2-(6′-METHOXY-2′-NAPHTHYL)ACETIC ACID

John H. Fried, and Ian T. Harrison, both of Palo Alto, Calif., assignors to Syntex Corporation, Panama

Continuation of Ser. No. 176,740, Aug. 31, 1971, abandoned, which is a continuation-in-part of Ser. Nos. 810,014, March 24, 1969, abandoned, Ser. No. 810,013, March 24, 1969, abandoned, and Ser. No. 694,771, Dec. 7, 1967, abandoned, each is a continuation-in-part of Ser. No. 608,997, Jan. 13, 1967, abandoned, said Ser. No. 810,014, and Ser. No. 810,013, each is a continuation-in-part of Ser. No. 694,771,. This application June 21, 1973, Ser. No. 372,028

Int. Cl.² C07C *65/14*

U.S. Cl. 260—520 2 Claims

1. 2-(6′-methoxy-2′-naphthyl)propionic acid.

2. As a compound of claim 1, d 2-(6′-methoxy-2′-naphthyl)propionic acid.

3,904,683

PROCESS FOR THE RESOLUTION OF d- AND 1-2-(6-METHOXY-2-NAPHTHYL) PROPIONIC ACID

John T. Day, Clarecastle, Ireland; Richard Waugh, Los Altos Hills, Calif.; Emil Lorz, and Dennis W. Lyle, both of Springfield, Mo., assignors to Syntex Corporation, Panama

Continuation-in-part of Ser. No. 279,329, Aug. 10, 1972, abandoned. This application Oct. 29, 1974, Ser. No. 518,447

Int. Cl.² C07C *65/00*

U.S. Cl. 260—520 30 Claims

1. A process for separating d 2-(6-methoxy-2-naphthyl)propionic acid acid from a mixture of d and l 2-(6-methoxy-2-naphthyl)propionic acid comprising providing a heated two-phase system having water as an aqueous phase and a water-immiscible, inert non-polar organic solvent as an organic phase, a mixture of a water-soluble salt of d 2-(6-methoxy-2-naphthyl)propionic acid and a water-soluble salt of l 2-(6-methoxy-2-naphthyl)propionic acid, and a salt of dehydroabietylamine which is soluble in said organic phase but is insoluble in said aqueous phase at the temperature to which said system is heated in an amount equal to about 1.0–1.3 mole per mole of said water soluble salt of l-2-(6-methoxy-2-naphthyl)propionic acid; holding said two-phase system at said elevated temperature to promote the formation of the dehydroabietylamine salt of l 2-(6-methoxy-2-naphthyl)propionic acid which is less soluble in said two-phase system than is the dehydroabietylamine salt of d 2-(6-methoxy-2-naphthyl)propionic acid; crystallizing said dehydroabietylamine

salt of l 2-(6 -methoxy-2-naphthyl)propionic acid; separating said crystallized salt from said two-phase system to thereby provide a mother liquor which is enriched in the water-soluble salt of d 2-(6-methoxy-2-naphthyl)propionic acid; separating said aqueous phase from said organic phase; and salting out a salt of d 2-(6-methoxy-2-naphthyl)propionic acid by adding to said aqueous phase an inorganic acid which is more soluble in said aqueous phase than is said water-soluble salt of d 2-(6-methoxy-2-naphthyl)propionic acid and crystallizing the least water-soluble salt of d 2-(6-methoxy-2-naphthyl)propionic acid from said aqueous phase.

3,904,684

METHOD FOR PRODUCING SODIUM CITRATE DIHYDRATE

Masahiko Tsuda; Yoshiaki Fujiwara, and Tetsuya Shiraishi, all of Hyogo, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Apr. 19, 1973, Ser. No. 352,644
Claims priority, application Japan, May 3, 1972, 47-43852
Int. Cl. C07c *59/16*
U.S. Cl. 260—535 P 2 Claims

1. A method for producing sodium citrate dihydrate which comprises (1) adjusting a citric acid fermentation broth obtained by using a hydrocarbon as the principal carbon source for the culture medium to a pH from 9 to 13 inclusive with sodium hydroxide, sodium carbonate or sodium hydrogen carbonate, (2) removing the insolubles from the resultant broth, (3) concentrating the resultant fluid while maintaining the fluid at a pH from 10 to 13 inclusive with sodium hydroxide, sodium carbonate or sodium hydrogen carbonate, and at a temperature of 50° to 65°C to precipitate sodium citrate dihydrate crystals and (4) recovering the thus formed crystals from the fluid.

3,904,685

POLYACRYLIC ACID HAVING HIGH CHELATION VALUE AND ITS PRODUCTION

Iraj Khatib Shahidi, Florham Park, N.J., and Jorge Alberto Blay, Corpus Christi, Tex., assignors to Celanese Corporation, New York, N.Y.

Filed July 20, 1973, Ser. No. 381,190
Int. Cl.[2] C07C *55/24*
U.S. Cl. 260—537 N 7 Claims

1. The process for producing a polyacrylic acid of high chelation value at 80% chelation which comprises polymerizing acrylic acid in aqueous solution at elevated temperature in the presence of an alkali metal or ammonium persulfate as initiator and about 0.5 to 4% by weight of acrylic acid of a chain transfer agent selected from the group consisting of an alkanethiol, a hydroxy alkanethiol and a carboxy alkanethiol.

3,904,686

PREPARATION OF THIOCARBAMYL SULFENAMIDES

Robert J. Arnold, Evanston, and Marion J. Gattuso, Hoffman Estates, both of Ill., assignors to Universal Oil Products Company, Des Plaines, Ill.

Filed Sept. 24, 1973, Ser. No. 400,289
Int. Cl.[2] C07C *155/08*
U.S. Cl. 260—551 S 7 Claims

1. In a process for the preparation of a thiocarbamyl sulfenamide which comprises the steps of:

1. reacting a secondary amine with carbon disulfide and an alkali hydroxide to form an alkali metal dithiocarbamate,
2. reacting a cycloalkylamine with an alkali metal hypochlorite to form an N-chlorocycloalkylamine, and thereafter
3. reacting the alkali metal dithiocarbamate and N-chlorocycloalkylamine to form the desired N,N-disubstituted-thiocarbamyl-N′-cycloalkylsulfenamide,

the improvement which comprises maintaining said N-chlorocyclohexylamine at a temperature of from about −5° to about 10° C. while adding thereto said alkali metal dithiocarbamate in a molar ratio of about 1.1:1 to about 1.25:1 moles of the latter per mole of the former, thereafter heating the mixture to a temperature of from about 40° to about 50° C. for about 0.02 to about 0.25 hours, and then cooling the reaction mixture to a temperature of from about 10° to about 15° C.

3,904,687

METHOD FOR PRODUCTION OF CATIONIC SURFACTANT

Shigeyuki Suzuki, Machida; Isamu Kaneda; Hiroshi Endo, both of Tokyo; Kazuo Miyata, Yamato; Tadao Horiguchi, and Kazumasa Yamamoto, both of Yokohama, all of Japan, assignors to Kureha Kagaku Kogyo K.K., Tokyo and Kurita Water Industries Ltd., Osaka, both of, Japan

Filed Oct. 18, 1971, Ser. No. 190,356
Claims priority, application Japan, Oct. 17, 1970, 45-90961
Int. Cl.[2] C07C *119/00*
U.S. Cl. 260—564 E 2 Claims

1. A water-soluble cationic surfactant produced by a method which comprises the steps of:

a. subjecting xylene to polycondensation by reacting the xylene with paraformaldehyde in the presence of a catalyst selected from the group consisting of sulfuric acid, aluminum chloride, para-toluene sulfonic acid, benzene sulfonic acid, zinc chloride and perchloric acid to produce a polycondensate of the xylene having a mean molecular weight of from 200 to 3,000.
b. introducing chlorine gas into said polycondensate under irradiation of ultraviolet light to substitute chlorine for the active hydrogen of the side chains of the xylene, while refluxing in a solvent selected from the group consisting of dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane, perchloroethylene, chlorobenzene, benzene, nitrobenzene and benzonitrile, and
c. subjecting the resultant chlorinated polycondensate to treatment with thiourea to cause the thioruea to react with the chlorine introduced into the polycondensate and thus render the chlorinated polycondensate water-soluble.

3,904,688

CONTINUOUS PROCESS FOR THE PRODUCTION OF 1,1,6,6-TETRAISOPROPYL-2,5-DIAZA-1,5-HEXADIENE

Claus-Dieter Mengler, Dorsten, and Hans-Peter Schüller, Marl, both of Germany, assignors to Chemische Werke Huls Aktiengesellschaft, Marl, Germany

Filed Oct. 14, 1971, Ser. No. 189,117
Claims priority, application Germany, Oct. 15, 1970, 2050548
Int. Cl. C07c *119/00*
U.S. Cl. 260—566 R 12 Claims

1. In a process for the production of 1,1,6,6-tetraisopropyl-2,5-diaza-1,5-hexadiene by reacting diisopropyl ketone with ethylenediamine in about a 2:1 molar ratio in the presence of a conventional acidic dehydration catalyst while removing the water of reaction azeotropically, the improvement which comprises conducting the reaction continuously in a reaction zone maintained at about 130°–270° C. and removing the 1,1,6,6-tetraisopropyl-2,5-diaza-1,5-hexadiene from the reaction zone at a rate such that the amount of 1,1,6,6-tetraisopropyl-2,5-diaza-1,5-hexadiene in the reaction zone is maintained at below 60 percent of theoretical, calculated on the proportion thereof to the unreacted starting ketone and amine in the reaction zone.

3,904,689

ALKANOLAMINE DERIVATIVES

Ernest John Ashby, Macclesfield, England, assignor to Imperial Chemical Industries Limited, London, England

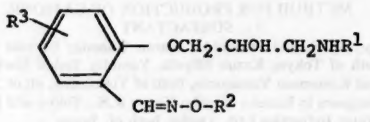
Filed May 8, 1973, Ser. No. 358,349

Claims priority, application United Kingdom, June 1, 1972, 25709/72

Int. Cl. C07c *131/00*

U.S. Cl. 260—566 A 5 Claims

1. An alkanolamine derivative selected from compounds of the formula:



wherein R^1 is alkyl or hydroxyalkyl, each of 3 or 4 carbon atoms which is branched at the α-carbon atom, or cycloalkyl of up to 6 carbon atoms, wherein R^2 is hydrogen or alkyl of up to 6 carbon atoms and wherein R^3 is hydrogen or halogen, and the salts thereof or pharmaceutically acceptable acids.

3,904,690

2-NITRO-META-PHENYLENEDIAMINES

Gregoire Kalopissis, Paris, and Andree Bugaut, Boulogne-sur-Seine, both of France, assignors to Societe Anonyme dite: L'Oreal, Paris, France

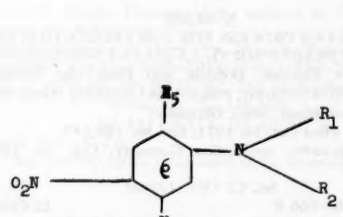
Continuation-in-part of Ser. No. 598,179, Dec. 1, 1966, Pat. No. 3,560,136. This application Sept. 8, 1970, Ser. No. 70,480

Claims priority, application Luxemburg, Dec. 3, 1965, 49990; Apr. 13, 1966, 50894; Oct. 19, 1966, 52201

Int. Cl. C07c *87/60*

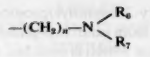
U.S. Cl. 260—570.5 P 10 Claims

1. A water soluble dye compound having the formula

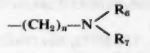


(I)

in which R_1, R_2, R_3, R_4 are selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms and



in which R_6 and R_7 are selected from the group consisting of hydrogen and a lower alkyl having 1–4 carbon atoms, R_6 and R_7 not being capable of representing a hydrogen atom when they are on a substitute chain of the nitrogen atom placed in para position of the group NO_2, n represents a number between 2 and 6, a single one of the four R_1, R_2, R_3, R_4 representing



and R_5 is selected from the group consisting of hydrogen, lower alkyl having 1–4 carbon atoms, halogen and lower alkoxy having 1–4 carbon atoms.

3,904,691

COMPOUNDS OF SPIRO-AMINE TYPE

Bernt Sigfrid Emanuel Carnmalm, Sodertalje; Tomas de Paulis, Gnesta; Svante Bertil Ross, Sodertalje; Sten Ingvar Rämsby, Sodertalje; Nils-Erik Stjernström, Sodertalje, and Sven-Ove Ögren, Sodertalje, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

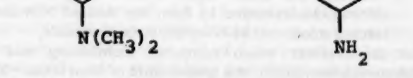
Filed May 25, 1972, Ser. No. 256,945

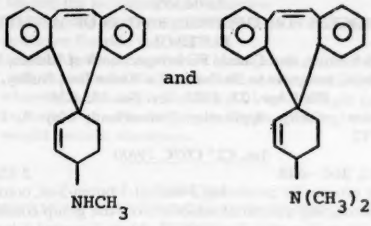
Claims priority, application Sweden, June 11, 1971, 7630/71

Int. Cl. C07c *87/64*

U.S. Cl. 260—576 8 Claims

1. A compound selected from the group consisting of





and pharmaceutically acceptable salts thereof.

3,904,692

PROCESS FOR THE DEHYDROGENATION OF SECONDARY ALCOHOLS

Christian Lassau, Paris, and Lucien Sajus, Croissy, Seine, both of France, assignors to Institut Francaise du Petrole, des Carburante et Lubrifiants, Rueil Malmaison, France

Filed Nov. 19, 1970, Ser. No. 91,190

Claims priority, application France, Nov. 26, 1969, 69.40856

Int. Cl.² C07C *45/16*

U.S. Cl. 260—586 P **17 Claims**

1. In a process for manufacturing ketones by dehydrogenating secondary alcohols, comprising contacting at least one secondary alcohol in the liquid phase with a catalytic quantity of a catalyst at a temperature between 25° and 350°C. to catalyze said dehydrogenation of said secondary alcohol to a ketone

the improvement which comprises using a catalyst which is formed by admixing a hydride, halide, sulfocyanide, alkoxide, acetylacetonate, cyclopentadienyl, camphosulphonate, stearate, oleate, octoate, 2-ethyl-hexanoate or naphthenic acid compound of a metal selected from the group consisting of titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, zirconium, molybdenum, ruthenium, rhodium, palladium, tungsten, iridium and platinum with a reducing agent selected from the group consisting of compounds of the formula AlH_nX_{3-n} wherein n is 1 or 2, X is the same or different and is OR, NR_2, NHR or SR wherein R is alkyl, cycloalkyl or aryl of 1 to 20 carbon atoms and when n is 1 both X groups may be joined to form a bivalent group -A-Z-B- wherein A and B are alkylene radicals having 1 to 8 carbon atoms and Z is oxygen, sulfur, alkylene of 1 to 3 carbon atoms, NH or N-Hydrocarbyl wherein the hydrocarbyl group has 1 to 8 carbon atoms; compounds of the formula $Me[AlH_mX'_{4-m}]_n$ wherein m is 1, 2 or 3, Me is a monovalent or divalent group Ia or IIa metal, X′ is the same as X defined above and R is as defined above; compounds of the formula AlR_2OR and AlR'_3 wherein R is as defined above, R′ is hydrogen or hydrocarbyl or 1 to 20 carbon atoms, at least one of them being hydrocarbyl and two R or R′ groups can be linked together to form a bivalent group as defined for X above and the corresponding compounds wherein boron replaces aluminum in each of the formulae above and the molar ratio of said organic reducing compound to said compound of a metal is 0.5:1 to 20:1, respectively.

3,904,693

DIMEDONE DERIVATIVES OF DIALDEHYDES

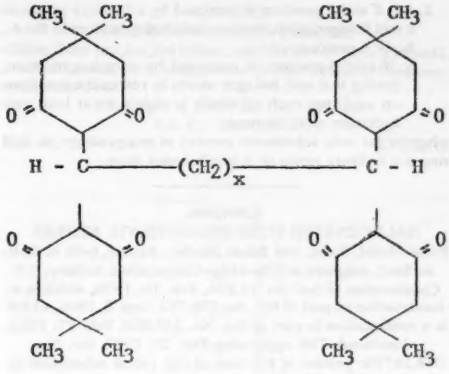
Robert G. Tabor, 1407 W. Tucker Blvd., Arlington, Tex. 76013

Filed Nov. 8, 1973, Ser. No. 413,771

Int. Cl.² C07C *49/36*

U.S. Cl. 260—586 R **4 Claims**

1. The compound of the formula:



where x is an integer from 2 to 4.

3,904,694

PROCESS FOR THE PRODUCTION OF DIBROMOPROPYL ETHERS OF HIGHLY HALOGENATED AROMATIC COMPOUNDS

Herbert Jenkner, Cologne, and Walter Buttgens, Konigswinter, both of Germany, assignors to Chemische Fabrik Kalk G.m.b.H., Germany

Filed Mar. 6, 1973, Ser. No. 338,620

Claims priority, application Germany, Mar. 7, 1972, 2210916

Int. Cl.² C07C *43/20*

U.S. Cl. 260—612 R **5 Claims**

1. In a process for the production of dibromo propyl ethers of highly halogenated aromatic compounds by the reaction of bromine with the corresponding allyl ethers of highly halogenated phenyl, diphenyl or naphthyl compounds, the improvement which comprises carrying out the reaction at a temperature of −20° to 50°C, in an inert liquid reaction medium which is essentially a non-solvent both for the dibromo propyl ether product and the corresponding allyl ether starting material, said inert reaction medium comprising an alkanoic monocarboxylic acid having 1 to 10 carbon atoms in its molecule.

3,904,695

PREPARATION OF PHLOROGLUCINOL AND ITS MONO-ETHERS

Andreas J. J. Hendrickx, and Nicolaas A. de Haij, both of Venlo, Netherlands, assignors to Andeno N.V., Venlo, Netherlands

Filed June 23, 1972, Ser. No. 272,928

Claims priority, application United Kingdom, June 24, 1971, 29687/71

Int. Cl.² C07C *43/20*, *37/02*

U.S. Cl. 260—613 D **16 Claims**

1. A method of preparing phloroglucinol, which comprises reacting a mono- or di-hydroxy benzene at a temperature between 110° and 180° C. with alkali metal hydroxide present at a concentration of between 12 and 30 mols of said hydroxide per mol of said benzene in the presence of between 1 and 10 ml. of water per 100 g. of said hydroxide, and acidifying the resulting alkali metal salt to form phloroglucinol, said benzene 1. having in a 3-position thereof relative to a hydroxy group on the benzene ring a hydrogen atom, another hydroxy group, or a halogen atom selected from the group consisting of chlorine and bromine atoms, and

2. (a) if said 3-position is occupied by a hydroxy group or a said halogen atom, having a said halogen atom in the 4-, 5-, or 6-position, or
b. if said 3-position is occupied by a hydrogen atom, having two said halogen atoms in respective positions on said ring each of which is vicinal to at least one hydrogen atom thereon;

wherein the only substituent present at any position on said ring is a hydroxy group or a said halogen atom.

3,904,696

HALOGENATED HYDROXY-DIPHENYL ETHERS

Ernst Model, Basel, and Jakob Bindler, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 11,894, Feb. 16, 1970, which is a continuation-in-part of Ser. No. 570,742, Aug. 8, 1966, which is a continuation-in-part of Ser. No. 345,080, Feb. 17, 1964, abandoned. This application Dec. 29, 1972, Ser. No. 319,267The portion of the term of this patent subsequent to Apr. 13, 1987, has been disclaimed.

Int. Cl.[2] C07C *43/22*

U.S. Cl. 260—613 R **7 Claims**

1. A compound selected from the group consisting of 2′,4,4′,5-tetrachloro-2-hydroxy-diphenylether, 4,4′,5-trichloro-2-hydroxy-diphenylether, 2′,4,4′-trichloro-5-bromo-2-hydroxy-diphenylether, 4,4′-dichloro-5-bromo-2-hydroxy-diphenylether, 4,4′,5-trichloro-3′-trifluoromethyl-2-hydroxy-diphenylether, 4′,5-dichloro-2-hydroxy-diphenylether.

3,904,697

1-BROMO-2,2,2-TRIFLUOROETHYL DIFLUOROMETHYL ETHER

Ross C. Terrell, Plainfield, N.J., assignor to Airco, Inc., Montvale, N.J.

Division of Ser. No. 139,862, May 3, 1971, Pat. No. 3,764,705. This application May 7, 1973, Ser. No. 358,209

Int. Cl.[2] C07C *43/00*

U.S. Cl. 260—614 F **1 Claim**

1. The compound 1-bromo-2,2,2-trifluoroethyl difluoromethyl ether of the formula $CF_3CHBr—O—CHF_2$.

3,904,698

STEROID SYNTHESIS

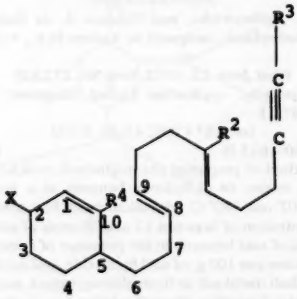
William S. Johnson, Portola Valley, Calif.; Ronald L. Markezich, Bloomfield, N.J., and Brian E. McCarry, East Palo Alto, Calif., assignors to The Board of Trustees of Leland Stanford Junior University, Stanford, Calif.

Filed Aug. 17, 1972, Ser. No. 281,380

Int. Cl.[2] C07C *35/18*

U.S. Cl. 260—617 R **1 Claim**

1. Compounds of formula



wherein R^2, R^3 and R^4 are hydrogen or methyl; X is hydroxyl.

3,904,699

PROCESS FOR THE PREPARATION OF METHYL BUTENOL

Heinrich Frick, and Claude Fürbringer, both of Riehen, Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 23, 1973, Ser. No. 353,836

Claims priority, application Switzerland, May 9, 1972, 6866/72

Int. Cl.[2] C07C *29/00*

U.S. Cl. 260—640 **2 Claims**

1. A process for producing 2-methyl-3-buten-2-ol, comprising hydrolyzing a material selected from the group consisting of 1-chloro-3-methyl-2-butene, 3-chloro-3-methyl-1-butene or mixtures thereof with 5 to 5,000 moles of water per mole of said material in the absence of an alkali to form a mixture containing 2-methyl-3-buten-2-ol and distilling said mixture at a temperature of from 0° to 30°C under reduced pressure of at most about 100 mm Hg to obtain 2-methyl-3-buten-2-ol as the distillate.

3,904,700

FLAME-RETARDANT COMPOSITION

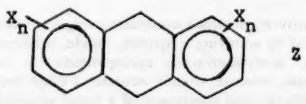
Lionel T. Wolford, Freehold, and Francis T. Wadsworth, Trenton, both of N.J., assignors to Cities Service Oil Company, Tulsa, Okla.

Division of Ser. No. 313,900, Dec. 11, 1972. This application Dec. 10, 1973, Ser. No. 423,030

Int. Cl.[2] C07C *25/18*

U.S. Cl. 260—649 R **1 Claim**

1. A compound corresponding to the formula:



wherein X is chloro or bromo, n is 0 or integer of 1–4 and Z is a divalent saturated polybromoalkylene or polybromocycloalkylene group containing 4–20 carbon atoms and 2–8 bromine atoms; said valences being on adjacent carbon atoms.

3,904,701

PROCESS FOR THE CATALYTIC HYDROFLUORINATION OF HALOGENATED HYDROCARBONS

Neithart Schultz, Eichsel, uber Rheinfelden; Hans-Joachim Vahlensieck, Wehr, Baden, and Rudolf Gebele, Rheinfelden, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 889,301, Dec. 30, 1969, abandoned. This application Mar. 26, 1973, Ser. No. 344,673

Claims priority, application Germany, Jan. 3, 1969, 1900241

Int. Cl. C07c *17/08, 17/20*

U.S. Cl. 260—653.6 **9 Claims**

1. In the process for reacting a halogenated aliphatic or cycloaliphatic hydrocarbon having at least 2 carbon atoms with hydrogen fluoride to prepare the corresponding fluorinated hydrocarbon having more fluorine than the halogenated aliphatic or cycloaliphatic hydrocarbon reactant at a temperature of about 150° to 240°C. at a residence time of about 0.1 to 40 seconds in the presence of a bismuth containing alumina catalyst; the improvement which comprises using as the catalyst a composition consisting essentially of a γ or η-aluminum oxide, 0.1 to 20 weight percent bismuth as a bismuth salt, said catalyst prepared by:

A. Heating γ or η-alumina to about 50° to 120°C;
B. Impregnating said alumina with a substantially homogeneous solution of a water soluble bismuth salt;

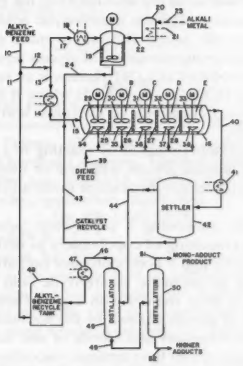
C. Drying the so impregnated alumina;
D. Heating said dry impregnated alumina in the presence of hydrogen fluoride and air; and
E. Increasing the proportion of hydrogen fluoride in said air until cessation of the exothermic reaction which ensues whereby said catalyst contains 0.01 to 20 weight percent bismuth, 35 to 66 weight percent fluorine and 24 to 42 weight percent aluminum.

3,904,702

REACTION OF ALKYLBENZENES WITH CONJUGATED DIENES

Richard E. Mitchell, Boothwyn, Pa., assignor to Sun Ventures, Inc., St. Davids, Pa.

Continuation-in-part of Ser. No. 282,995, Aug. 23, 1972, abandoned. This application Sept. 17, 1973, Ser. No. 398,112
Int. Cl.² C07C *3/10, 15/02*
U.S. Cl. 260—668 B **18 Claims**



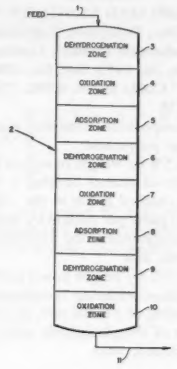
1. Method of reacting an alkylbenzene having 1–4 alkyl substituents collectively containing at least three benzylic non-tertiary hydrogen atoms with a C_4-C_5 conjugated alkadiene to produce mono-adduct product which comprises:
A. forming a slurry of said alkylbenzene and an alkali metal in particulate form, said alkali metal being potassium, sodium or a potassium-sodium mixture;
B. continuously passing the slurry under alkenylation conditions through a series of successive reaction zones substantially isolated from each other while continuously and independently mixing the slurry in each zone;
C. continuously feeding a separate stream of the C_4-C_5 conjugated alkadiene to each of said reaction zones and dispersing same into the slurry within the zone at a rate to maintain a low concentration of the diene in the slurry, the amount of total diene to all zones being controlled to provide less than 0.5 mole diene per mole of alkylbenzene feed;
D. passing the resulting mixture from the last of said zones to a separation zone and therein separating alkali metal from the bulk of the hydrocarbon phase;
E. separating unreacted alkylbenzene from the alkenylated product;
F. and recycling the unreacted alkylbenzene to Step (A), said series of reaction zones in step (B) being effective to reduce the formation of by-product diadduct which is formed by the addition of a mole of alkadiene to at least two alkyl groups of said alkylbenzene.

3,904,703

DEHYDROGENATION PROCESS

Ching-Tsan Lo; Joe Jed Miller, and Norbert Francis Cywinski, all of Odessa, Tex., assignors to El Paso Products Company, Odessa, Tex.

Filed Apr. 9, 1973, Ser. No. 349,326
Int. Cl.² C07C *5/18*
U.S. Cl. 260—669 R **13 Claims**



1. In a method for conducting a dehydrogenation reaction involving contact of a hydrocarbon feedstock with sequences of dehydrogenation catalyst and reducible oxidation catalyst in mutually exclusive zones, the improvement which comprises separating adjacent sequences of catalyst zones with a zone of steam adsorbent.

3,904,704

PROCESS FOR PREPARING NONCONJUGATED DIOLEFINS

Jay G. Bryson, Tallmadge, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 18, 1974, Ser. No. 452,241
Int. Cl.² C07C *3/21*
U.S. Cl. 260—680 B **6 Claims**

1. A process for codimerizing conjugated diolefins selected from the group consisting of isoprene, piperylene, 2-ethyl-1,3-butadiene, 2-phenyl-1,3-butadiene, 2-methyl-1,3-pentadiene and 3-methyl-1,3-pentadiene with lower α-olefins to nonconjugated diolefins which comprises contacting said diolefins and lower α-olefins with a ternary catalyst system consisting essentially of (1) an iron compound selected from the group consisting of iron salts of carboxylic acids containing from 2 to 40 carbon atoms and iron complexes of 1,3-diketones, (2) an organoaluminum compound selected from the group consisting of trialkyl aluminums, lithium tetraethyl aluminate and diethyl aluminum ethoxide, and (3) a bidentate nitrogen compound selected from the group consisting of glyoxal-bis-(2,6-dimethylanil), biacetyl-bis-(2,6-dimethylanil), glyoxal-bis-(4-methylanil), biacetyl-bis-(4-methylanil), glyoxal-bis-(2-methylanil), biacetyl-bis-(2-methylanil), glyoxal-bisanil, biacetyl-bisanil, glyoxal-bis-(4-ethoxyanil), biacetyl-bis-(4-ethoxyanil), glyoxal-bis-(3-methoxyanil), biacetyl-bis-(3-methoxyanil), glyoxal-bis-(4-dimethylaminoanil), biacetyl-bis-(4-dimethylaminoanil), glyoxal-bis-(2,6-dimethyl-4-ethoxyanil), biacetyl-bis-(2,6-dimethyl-4-ethoxyanil), 2-pyridine carboxaldehydeanil, 2-pyridine carboxaldehyde-2-methylanil, 2-pyridinecarboxaldehyde-4-methylanil, 2-pyridinecarboxaldehyde-2-isopropylanil, 2-pyridinecarboxaldehyde-2-ethylanil, 2-pydridinecarboxaldehyde-4-methoxyanil, 2-pyridinecarboxaldehyde-4-dimethylaminoanil, 2-pyridinecarboxaldehyde-2,6-dimethyl-4-methoxyanil, 2-pyridinecarbox-

aldehyde-2,6-dimethyl-4-dimethylaminoanil, 2-pyridinecarboxaldehyde-2,6-diethyl-4-diethylaminoanil, 2-acetylpyridine-2-methylanil, 2-acetylpyridine-4-methylanil, 2-acetylpyridine-2-isopropylanil, 2-acetylpyridine-2,6-diethylanil, 2-acetylpyridine-4-methoxyanil, 2-acetylpyridine-4-dimethylaminoanil, 2-acetylpyridine-2,6-dimethyl-4-methoxyanil and 2-acetylpyridine-2,6-diethyl-4-diethylaminoanil.

3,904,705

THERMALLY STABILIZED SYNTHETIC POLYAMIDES

Trevor Raymond White, Pontypool, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Nov. 30, 1973, Ser. No. 420,575
Int. Cl.[2] C08G *69/46;* **C08L** *77/00*
U.S. Cl. 260—857 TW **4 Claims**

1. A polyamide composition consisting essentially of
a. a synthetic linear polyamide;
b. from 0.005 to 0.5% by weight based on the polyamide of a sterically hindered phenol bearing a secondary of tertiary alkyl or cycloalkyl group in the ortho position;
c. from 10 to 1,000 parts per million by weight based on the polyamide of phosphorus in the form of a reducing phosphorus compound; and
d. from 0.005 to 0.5% by weight based on the polyamide of a reducing sulphurcontaining compound selected from the group consisting of a metal salt, an ammonium salt or an organic ester of thiophosphoric acid, thiodipropionic acid and thiocarbamic acid.

3,904,706

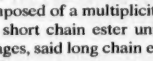
STABILIZATION OF POLYMERS CONTAINING POLY(ALKYLENE OXIDE) UNITS

Guenther Kurt Hoeschele, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 15, 1973, Ser. No. 341,334
Int. Cl. C08g *51/60*
U.S. Cl. 260—858 **13 Claims**

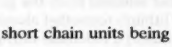
1. A composition of matter consisting essentially of a physical mixture of (1) a copolyetherester elastomer, (2) a mono- or polyurethane which on hydrolysis yields a primary amino group, carbon dioxide, and a hydroxyl group, and (3) up to 5 percent by weight based on the weight of the copolyetherester elastomer, of an antioxidant, said copolyetherester elastomer being composed of a multiplicity of recurring long chain ester units and short chain ester units joined head-to-tail through ester linkages, said long chain ester units being represented by the formula

I



and said short chain units being represented by the formula

II



where G is a divalent radical remaining after the removal of terminal hydroxyl groups from a poly(alkylene oxide) glycol having a molecular weight of about 400–6000 and a carbon to oxygen ratio of about 2.0–4.3; R is a divalent radical remaining after removal of carboxyl groups from a dicarboxylic acid having a molecular weight less than about 300 and D is a divalent radical remaining after removal of hydroxyl groups from a diol having a molecular weight less than about 250; provided said short chain ester units amount to about 15–95 percent by weight of said copolyetherester elastomer; said copolyetherester elastomer being stabilized against oxidative degradation at elevated temperatures because of additives 2) and 3).

3,904,707

FLAME RETARDANT POLYESTER COMPOSITIONS

Charles J. Gebhart, Akron, and Clyde E. Gleim, Bath, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Continuation of Ser. No. 370,125, June 14, 1973, abandoned. This application Nov. 25, 1974, Ser. No. 526,545
Int. Cl.[2] C08G *39/10*
U.S. Cl. 260—873 **7 Claims**

1. Flame retardant linear polyester compositions comprising
A. a high molecular weight essentially linear copolyester selected from the group consisting of
1. copolyesters prepared by reacting two or more dicarboxylic acids or the C_1–C_4 lower alkyl esters thereof, where said acids are selected from the group consisting of saturated aliphatic dicarboxylic acids and aromatic dicarboxylic acids, with one or more glycols selected from the group consisting of glycols represented by the formulas $HO(CH_2)_nOH$ where n is an integer from 2 to 10 and $HOCH_2C(R)_2CH_2OH$ where R is selected from the group consisting of hydrogen and alkyl and aryl radicals,
2. copolyesters prepared by reacting two or more of the above defined glycols with one or more of the above defined dicarboxylic acids or lower alkyl esters thereof, and
3. blends comprising a copolyester selected from the group consisting of copolyesters as defined in (1) and (2) above and a homopolyester prepared by the reaction of an aromatic dicarboxylic acid or lower alkyl (C_1–C_4) ester thereof with a glycol selected from the group of glycols defined by the formulas above
where said copolyesters and blends of said copolyesters and homopolyesters of (A) have intrinsic viscosities of at least 0.5 and
B. a synergistic mixture comprised of from 5 to 10 percent by weight based on the total weight of said polyester compositions, of polyvinyl chloride and from 5 to 10 percent by weight, based on the total weight of said polyester compositions of at least one material selected from the group consisting of antimony trioxide, boron trioxide, tetrabromophthalic anhydride, tetrachlorophthalic anhydride and chlorendic acid anhydride.

3,904,708

PROCESS FOR GRAFT POLYMERIZATION

Joseph P. Kennedy, 632 Lincoln Park East, Cranford, Union County, N.J. 07016, and Francis P. Baldwin, 19 Winchester Rd., Summit, Union County, N.J. 07901

Continuation-in-part of Ser. No. 568,001, July 26, 1966, abandoned, which is a continuation-in-part of Ser. No. 364,295, May 1, 1964, abandoned. This application Jan. 8, 1968, Ser. No. 700,324
Int. Cl.[2] C08F *4/52, 259/02, 279/02*
U.S. Cl. 260—878 R **3 Claims**

1. A process for preparing a graft copolymer which comprises reacting a cationically polymerizable monomer selected from the group consisting of sytrene, αmethyl styrene, p-chloro styrene, propene, 1-pentene, 2-ethyl-1-hexene, isoprene, chloroprene, dimethylbutadiene, piperylene, cyclopentadiene, cyclohexadiene, beta-pinene and methylene norbornene with a halogenated polymer selected from the group consisting of polychloroprene, halogenated polyisoprene, halogenated polybutadiene, halogenated polypiperylene and halogenated butyl rubber in the presence of a catalyst consist-

ing essentially of a compound having the formula AlM_2R wherein M is a C_1-C_{12} alkyl radical and R is selected from the group consisting of M, hydrogen and halogen wherein said

polymer is the backbone of said graft polymer, said reaction is carried out in an inert solvent at a temperature of from about −90° to about +70°C.

3,904,709

PROCESS FOR PRODUCING THERMOPLASTIC RESINS

Masayoshi Morimoto; Tetsutaro Sanjiki; Hideki Horiike, and Motonobu Furuta, all of Ichihara, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jan. 15, 1973, Ser. No. 323,715

Claims priority, application Japan, Jan. 17, 1972, 47-7111

Int. Cl. C08f *15/00*

U.S. Cl. 260—878 R **8 Claims**

1. In a process for producing a graft-co or terpolymeric thermoplastic resin consisting of an ethylene-propylene rubber and an aromatic vinyl compound or of an ethylene-propylene rubber, an aromatic vinyl compound and a vinyl cyanide compound by using a radical catalyst, the improvement which comprises

subjecting these materials to solution polymerization at a temperature of 30° to 120°C for 5 to 40 hours

in a mixed solvent consisting of 95 to 5% by weight of at least one aromatic hydrocarbon solvent capable of dissolving the ethylene-propylene rubber and 5 to 95% by weight of at least one polar solvent capable of dissolving poly (aromatic vinyl compound) in the case of the graft-copolymer or aromatic vinyl compound-vinyl cyanide compound copolymer in the case of the graft-terpolymer, the aromatic hydrocarbon solvent being selected from the group consisting of benzene, toluene, dimethylbenzene, xylene, ethylbenzene, diethylbenzene, and triethylbenzene,

the polar solvent being selected from the group consisting of ketones, esters, ethers, chlorine-substituted aliphatic hydrocarbons, nitrogen-containing hydrocarbons and sulfur-containing hydrocarbons,

the ethylene-propylene rubber comprising ethylene and propylene in a molar ratio of from 5.1 to 1:3 and being selected from the group consisting of two-component polymer comprising ethylene and propylene and ethylene-propylene-diene terpolymer containing as the third component a diene selected from the group consisting of dicyclopentadiene, ethylidenenorbornene, 1,4-hexadiene, 1-5-hexadiene, 2-methyl-1, 5-hexadiene, 1,4-cycloheptadiene, 1,5-cyclooctadiene and mixtures thereof and having an iodine value of 4 to 50,

the aromatic vinyl component being selected from the group consisting of styrene, α-methylstyrene, α-chlorostyrene and diemthylstyrene, and

the vinyl cyanide compound being selected from the group consisting of acrylonitrile and methacrylonitrile.

3,904,710

PESTICIDAL O,S'-DIALKYL S-PHENYLTHIOALKYL DITHIOPHOSPHATES AND PREPARATION THEREOF

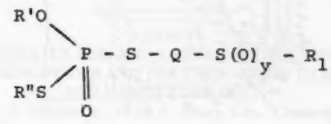
Alexis A. Oswald, Mountainside, and Paul L. Valint, Jr., Woodbridge, both of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Division of Ser. No. 173,267, Aug. 19, 1971, abandoned, which is a continuation of Ser. No. 821,117, May 1, 1969, abandoned. This application July 9, 1973, Ser. No. 377,872

Int. Cl.² C07F *9/165;* **A01N** *9/36*

U.S. Cl. 260—949 **5 Claims**

1. A compound of the formula



wherein R' is C_1 to C_{16} alkyl; R'' is C_3 to C_{16} alkyl; R_1 is phenyl or phenyl substituted by halogen, methylthio, methylsulfonyl or nitro; Q is C_1 to C_6 alkylene; and *Y* is 0 to 2.

3,904,711

PREPARING UNSYMMETRICAL DITHIOPHOSPHONIC ACID DIESTERS

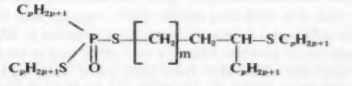
Alexis A. Oswald, Mountainside, and George N. Schmit, Scotch Plains, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 823,497, May 9, 1969, abandoned, which is a continuation-in-part of Ser. No. 732,553, May 28, 1968, Pat. No. 3,751,530. This application Aug. 12, 1971, Ser. No. 171,311

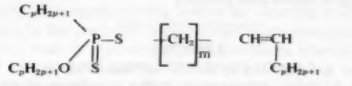
Int. Cl. C07f *9/40;* **A01n** *9/36;* **C10m** *1/48*

U.S. Cl. 260—968 **5 Claims**

1. A process for preparing unsymmetrical dithiophosphonic acid diesters having the general formula:



comprising the steps of reacting a compound of the formula:



with a thiol of the general formula:

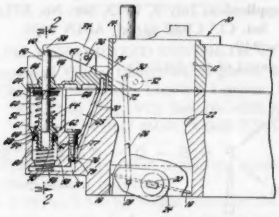
$C_pH_{2p+2}SH$

wherein *m* is 0 to 1, *p* is 1 to 4, in the presence of a free radical catalyst with both a dealkylating agent and an alkylating agent said dealkylating agent being selected from the group consisting of $(R^{XXIX})_3G$; $R^{XXX}SM$ and XM wherein R^{XXIX} and R^{XXX} are C_1 to C_4 alkyls, G is a nitrogen or phosphorus base, M is alkali, alkaline earth metal tetraalkyl ammonium or tetraalkyl phosphonium, X is chlorine, bromine or iodine and said alkylating agent selected from the group consisting of methyl bromide, ethyl chloride, n-propyl bromide, isopropyl iodide, hexadecyl chloride, methyl tosylate, trimethyl phosphite, trimethyl phosphate and tripropyl phosphite wherein the sequence of adding the thiol and the dealkylating-alkylating agent can be reversed.

3,904,712
CARBURETOR FUEL BOWL VENT

Roland S. Taylor, Fairport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 25, 1974, Ser. No. 436,492
Int. Cl. F02m *5/08*
U.S. Cl. 261—34 A **3 Claims**



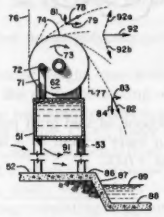
1. An internal combustion engine carburetor having an air inlet for air flow to the engine, a throttle disposed in said air inlet and movable between closed and open positions for controlling air flow therethrough, a fuel bowl, said fuel bowl having a fuel vapor region in its upper portion, a cover member for said fuel bowl, said cover member having a vent aperture opening from said region for discharging fuel vapor therefrom and a valve seat surrounding said aperture, a vent valve biased into engagement with said valve seat for controlling the flow of fuel vapor through said aperture, an accelerator pump bore vertically disposed in said carburetor, an accelerator pump plunger disposed in said bore and defining a discharge chamber within said bore, inlet means for supply fuel from said fuel bowl to said chamber, a discharge passage for delivering fuel from said chamber to said air inlet, a stem for reciprocating said plunger within said bore to discharge fuel from said chamber through said passage to said inlet when said stem moves downwardly, said stem having a radially extending flange, and linkgage means operatively connecting said stem with said throttle for moving said stem upwardly as said throttle is moved to said closed position and downwardly as said throttle is moved to said open position, wherein the improvement comprises: a resilient valve operating arm movable between a lower and a raised position, said arm having one end secured to said cover member, said arm having another end engageable with said vent valve when said arm is in said raised position, said arm including means which engages said flange only when said pump is near its uppermost position to lift said arm to said raised position whereby said other end of said arm engages and lifts said valve from said valve seat, said arm being biased from said raised position whereby said arm returns to said lower position and disengages said valve when said pump is below said position.

3,904,713
LIQUID COOLING APPARATUS

Leonard J. Boler, Minneapolis, Minn., assignor to Cherne Industrial, Inc., Edina, Minn.

Filed Oct. 10, 1972, Ser. No. 296,777
Int. Cl.² B05B *3/08*
U.S. Cl. 261—90 **21 Claims**

1. Liquid cooling apparatus comprising an open-air receiving reservoir, a source of heated liquid and liquid projection means for controlled projection of liquid drops of said heated liquid above said open air receiving reservoir in trajectories, particle sizes, velocities and volume rates providing a directional wind effect in essentially one horizontal direction for improved cooling of said heated liquid on a continuous basis, said liquid projection means comprising a plurality of liquid spray members each adapted to project liquid drops having drop sizes of at least one millimeter in diameter in trajectories, substantially all of which have a very substantial horizontal components extending in said one horizontal direction, at initial velocities in the range from 15 to 45 feet per second, and said spray members being spaced from each other generally crosswise of said one horizontal direction and having a construction and relative spacing adapted to spray such drops in said one horizontal direction in trajectories substantially all of which are initially directed within a zone extending above the open-air reservoir and below a maximum of 70° above the horizontal, as measured at each spray member, and at a collective volume rate corresponding to at least 2 lbs. of water per second for each linear foot measured horizontally, along a line perpendicular to said one horizontal direction, between the endmost spray members of said apparatus, and thereby

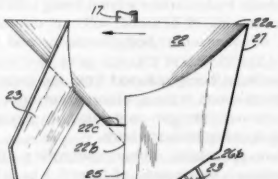


essentially filling a substantial frontal cross section area of the space above the reservoir in said one horizontal direction beyond said spray members, said liquid spray members comprising a plurality of rotatable spray members mounted for rotation around a generally horizontal common axis of rotation, means for simultaneously rotating said spray members around said axis in one common angular direction of rotation, and means for feeding liquid to be cooled to at least one surface of each spray member at a limited area from which the rotation of the spray members carries the liquid and projects it from each spray member in said trajectories, substantially all of which have horizontal components extending in one common horizontal direction.

3,904,714
LOW-SPEED MECHANICAL AERATOR IMPELLER

Thomas C. Rooney, Waukesha, and Robert E. Crandall, Greendale, both of Wis., assignors to Rexnord Inc., Milwaukee, Wis.

Filed Sept. 26, 1973, Ser. No. 401,100
Int. Cl.² B01F *7/22*
U.S. Cl. 261—91 **4 Claims**



1. In apparatus for aerating and mixing a body of water, said apparatus comprising rotational drive means having a vertical output shaft extending downwardly therefrom, an impeller fixed to the lower end of said shaft and having a lower inlet end, and means for supporting said drive means so that the upper end of the impeller is at a selected elevation above the water surface and the lower end of the impeller is at a selected level of submergence; the improvement wherein said impeller comprises a conical shroud of R height and between three and five flat blades, the larger upper end of the shroud defining the upper end of the impeller and having a radius R, each said

blade being in the form of a flat plate which is set with a 30° rearward rake having reference to the upward direction of the flow toward the propeller and disposed so that its plane intersects the impeller axis at the upper end of the impeller, the perimeter of each blade consisting of (1) a part which adjoins the shroud, (2) a leading edge, (3) an inner inlet edge, (4) an outer inlet edge, and (5) an outlet edge, said leading edge of each blade extending from the shroud downwardly and radially outward to the inner inlet edge of the blade, the outlet edge of each blade being of R height and having a radius of between R and 1.5R and extending from the outer inlet edge to the upper outer edge of the shroud, the inner inlet edges of the blades being about 0.3R below the lower end of the shroud and defining the lower end of the impeller.

3,904,715

METHOD FOR BONDING A ROCKET MOTOR LINER TO A SOLID ROCKET PROPELLANT GRAIN

George F. Sieg; Howard W. Gerrish, Jr.; John D. Braun, and M. Frank Pickett, all of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 26, 1971, Ser. No. 190,448

Int. Cl.[2] A61J *5/04*

U.S. Cl. 264—3 R **2 Claims**

1. A method for chemically attaching a solid rocket propellant grain which contains polybutadiene as the binder to a rocket motor liner which contains polybutadiene, said method comprising the steps of

a. casting said liner into a rocket motor case and curing it;

b. painting the cured liner with a coat of a bromine terminated phenol-formaldehyde copolymer dissolved in normal hexane, said copolymer having a bromine content of from 28 to 32 weight percent, a Gardner-Holt viscosity in the range of from 24 to 28 at 25° C., and a specific gravity of 1.20 ± .03;

c. allowing said coat to dry for from about 15 to about 30 minutes at room temperature; and

d. casting said solid rocket propellant grain into said rocket motor case and curing it.

3,904,716

CARBON FIBRE PRODUCTION

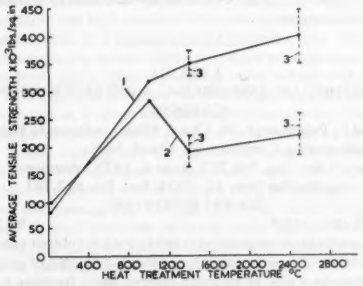
Roger Moreton, Church Crookham, and William Watt, Farnborough, both of England, assignors to National Research Development Corporation, London, England

Filed Apr. 4, 1974, Ser. No. 458,035

Claims priority, application United Kingdom, Apr. 6, 1973, 16546/73

Int. Cl. B29c *25/00*

U.S. Cl. 264—29 **12 Claims**



1. A process for the preparation of polyacrylonitrile precursor fibres and their subsequent conversion to carbon fibres which includes the steps of spinning the polyacrylonitrile precursor fibres from solution, heating the precursor fibres at a temperature in the range 200°–300°C in an oxidising atmosphere for a time sufficient to permit complete permeation of oxygen while the natural shrinkage of the fibre is at least restrained, followed by carbonisation and further heat treatment at temperatures of up to 3000°C which includes the improvement wherein the spinning process and oxygen permeation process are carried out under conditions in which particles, and in the case of the spinning solution, gas bubbles, are excluded from the liquids employed in the spinning process and from the gases in which such process and the oxygen permeation process take place, whereby carbon fibres are produced having an ultimate tensile strength which increases over the whole range of final heat treatment temperatures.

3,904,717

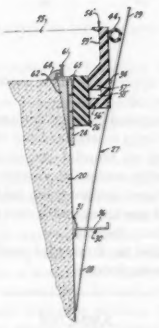
APPARATUS FOR AND METHOD OF EQUIPPING SWIMMING POOLS AND THE LIKE WITH A TILE BAND AND CANTILEVER DECK

William J. Stegmeier, 1021 C Shary Cir., Concord, Calif. 94520

Continuation-in-part of Ser. No. 327,671, Jan. 29, 1973, and a continuation-in-part of Ser. No. 299,207, Sept. 20, 1972, Pat. No. 3,850,403, and a continuation-in-part of Ser. No. 299,208, Sept. 20, 1972, Pat. No. 3,850,404, and a continuation-in-part of Ser. No. 299,209, Sept. 20, 1972, abandoned. This application Jan. 30, 1974, Ser. No. 438,018

Int. Cl.[2] E04B *1/16;* **E04G** *11/02*

U.S. Cl. 264—34 **21 Claims**



20. In a method of equipping a swimming pool wall and the like with a band of tile adjacent its upper edge and with a cantilever deck overlying the wall in overhanging relation with the tile band, the steps of: providing an elongated board structure and an elongated spring holder for securing said board structure to the pool wall; locating said board structure along said pool wall at a predetermined elevation; attaching said holder to said pool wall and developing a bending moment about such attachment effective to urge said holder toward the pool wall and against said board structure to force the latter into frictional engagement with the pool wall so as to be supported therealong; said holder being attached intermediate the ends thereof to said pool wall at a location below said board structure, the bending moment about such attachment being effective to urge the upper end portion of said holder toward such pool wall.

21. The method of claim **20** in which said board structure is an elongated ledger board, and further providing an elongated form having a configurated portion in the shape to be imposed thereby upon the overhanging edge portion of such deck; supporting a band of tile along said ledger board in upwardly extending relation therewith and securing the tile in position along said pool wall; releasing said ledger board from said holder and removing the ledger board from said pool wall;

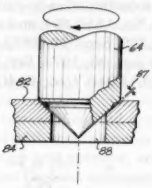
locating said form along said band of tile to dispose the configurated form portion thereabove; moving said holder to a higher elevation for engagement with said form and attaching the holder intermediate the ends thereof to the same aforesaid location and developing a bending moment about such attachment effective to urge the upper end portion of the holder toward said pool wall and against said form to force the latter into frictional engagement with the tile band so as to be supported therealong; and after a concrete mass has been poured against said form and cured sufficiently to be self-sustaining, releasing said form from said holder and removing the form and said holder.

3,904,718

COUNTERSINK SEALANT APPLICATION METHOD

Riley Kuehn, Jr., Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sept. 3, 1974, Ser. No. 502,720
Int. Cl.² B29C *5/04*
U.S. Cl. 264—39 **5 Claims**



1. A method for applying sealant material to a workpiece comprising the steps of:

A. placing an elongated bead of sealant on a flexible strip,

B. moving said strip in engagement with a rotating applicator tip having an annular recess on a lateral surface thereof to transfer sealant from said strip to said recess and to clean excess sealant from said tip,

C. contacting said workpiece with said tip to form an annular bead of sealant thereon,

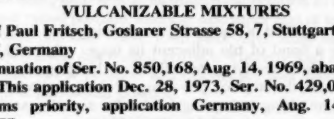
D. withdrawing said tip from said workpiece, leaving said bead on said workpiece.

3,904,719

PROCESS FOR THE CONTINUOUS PRODUCTION OF VULCANIZABLE MIXTURES

Rudolf Paul Fritsch, Goslarer Strasse 58, 7, Stuttgart-Weilimdorf, Germany

Continuation of Ser. No. 850,168, Aug. 14, 1969, abandoned. This application Dec. 28, 1973, Ser. No. 429,069
Claims priority, application Germany, Aug. 14, 1968, 6746177
Int. Cl.² B29B *5/04;* **B29F** *3/06*
U.S. Cl. 264—40 **2 Claims**



1. A method of continuously and controllably proportioning the components of a vulcanizable mixture in a screw extruding machine having a bore, at least one screw shaft located in said bore, a back-pressure device, a first inlet located upstream of said back-pressure device, a second inlet located downstream of the back-pressure device, said first inlet having a downstream edge defined, in part, by a slide member slidably mounted for movement on said machine, said slide member defining, in part, a back-pressure zone in said bore extending between said downstream edge of said first inlet and said back-pressure device, said back-pressure zone having a length that is variable corresponding to sliding movement of said slide member on said machine, the steps comprising:

rotating the screw shaft at constant speed,

introducing in an undosed condition the component forming the bulk portion of the material through the first inlet to fill said inlet,

operating said back-pressure device to develop a back-pressure in said back-pressure zone,

varying the position of said slide member relative to said back-pressure device so as to vary the length of said back-pressure zone to maintain a predetermined pressure at said downstream edge of said inlet,

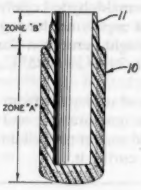
introducing another component of the material to be mixed through said second inlet in a dosed condition determined by the desired characteristics of the extruded product.

3,904,720

METHOD OF FORMING BODIES OF FOAMED PLASTISOLS HAVING ALVEOLATE EXTERIOR SURFACES

Gerald D. Sjostrand, 4734 E. Home St., Fresno, Calif. 93703

Filed Dec. 19, 1973, Ser. No. 426,321
Int. Cl.² B29C *5/12, 13/04;* **B29D** *27/04*
U.S. Cl. 264—45.5 **5 Claims**



1. In a method of forming bodies of blown plastisol having an alveolate exterior surface, the steps of:

A. depositing on a substrate a gelled body of a non-aqueous vinyl dispersion including a chemical blowing agent which decomposes above the fusing temperature of said dispersion; and

B. exposing the surface of said body to contact with a heated liquid of a liquid bath maintained at a temperature substantially above the fusion temperature of said vinyl dispersion and at which the blowing agent decomposes for causing said dispersion to fuse and said blowing agent to decompose.

3,904,721

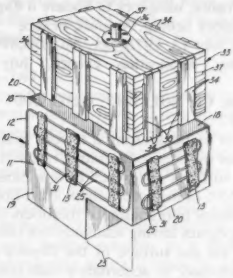
METHOD OF ASSEMBLING A REFRIGERATION CABINET

Richard L. Puterbaugh, St. Cloud, Minn., assignor to Franklin Manufacturing Company, St. Cloud, Minn.

Division of Ser. No. 366,752, June 4, 1973, abandoned. This application Nov. 11, 1974, Ser. No. 522,781
Int. Cl.² B29D *31/00*
U.S. Cl. 264—46.5 **9 Claims**

1. A method of assembling a refrigeration cabinet comprising the steps of positioning interconnected lengths of evaporator tubing on a side of an inner cabinet liner, foaming a layer of insulating foam in place on the evaporator tubing and outer surface of the liner with sufficient strength, adhesion, and area to hold the tubing to the outer liner surface, positioning the assembly of the tubing, liner, and first layer of foam in a shell forming the outer surface of the cabinet, and foaming a sec-

ond layer of insulating foam between the first foam layer and the shell to fill and thereby heat insulate the space between

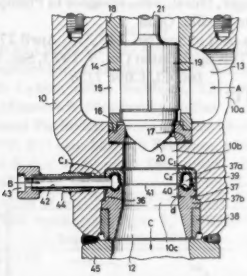


said liner and said shell not occupied by said first layer and said tubing.

3,904,722
STEAM REFORMING DEVICE

Toshiaki Onoda, Yokohama, and Shokichi Kubota, Matsudo, both of Japan, assignors to Tokico Ltd., Kawasaki, Japan

Filed July 30, 1973, Ser. No. 383,515
Claims priority, application Japan, July 31, 1972, 47-76661
Int. Cl. B01f *3/04*
U.S. Cl. 261—64 R **8 Claims**

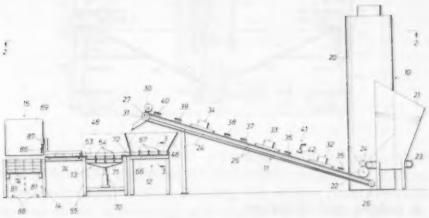


1. A steam reforming device comprising: a casing structure having a steam inlet, a steam outlet and consecutive passageways therebetween; pressure reducing valve means in an intermediate part of said steam passageways and operating to reduce the pressure of superheated steam flowing at high temperature and high pressure into said passageways through said steam inlet to a predetermined pressure value; and temperature reducing means within the steam passageways downstream from said pressure reducing valve means and constituted as a separate structure therefrom and operating to discharge water as a spray into the high-temperature, low-pressure steam thus reduced in pressure by the pressure reducing valve means and thereby to reduce the temperature of this steam to a predetermined temperature value, said temperature reducing means comprising an orifice-forming member forming said passageway through which the steam reduced in pressure by said pressure reducing valve means flows and, moreover, forming an annular hollow space and an annular orifice of slit-form in the wall surface of the orifice-forming member, a hollow sleeve disposed within said annular hollow space in the orifice-forming member and having a slit communicating with said orifice, said sleeve having an outer peripheral shape conforming to said annular hollow space and being supported all around the periphery therein and projection and groove means between said sleeve and said annular hollow space for minimizing the area of contact therebetween and for maintaining temperature differential therebetween, and a water supply pipe extending through said casing structure into communication with the interior of the sleeve, said orifice and said passageway being so constructed that the flow of the steam through the passageway causes water to be ejected as a spray through the orifice and into the passageway.

3,904,723
CONCRETE PRODUCT MANUFACTURING SYSTEM AND METHOD

Douglas F. Prince, Houston, Tex., assignor to Castone Development Corporation, Houston, Tex.

Filed Nov. 16, 1972, Ser. No. 307,154
Int. Cl. B28b *1/08, 1/10*
U.S. Cl. 264—71 **7 Claims**



1. A method of manufacturing concrete products comprising the steps of:

a. combining raw materials, including cement and aggregates;
b. blending said raw materials together;
c. continuously feeding said blended materials onto conveyor means;
d. continuously adding liquid to said blended materials as they move along said conveyor means;
e. continuously mixing said liquid and blended materials together to form a wet concrete mixture as said mixture moves along said conveyor means;
f. continuously feeding said wet mixture into receiver means so as to maintain a static head therein;
g. precompacting the wet mix in said receiver;
h. feeding said wet concrete mixture from said receiver means into mold means while maintaining, in said mold means, the static head of said wet concrete mixture in said receiver means subjecting said mold means to a partial vacuum, and while vibrating said mold and receiver means to form precured concrete products of the desired density without application of external pressure other than said partial vacuum and said static head of said wet concrete mixture; and
i. removing said precured concrete products from said mold means.

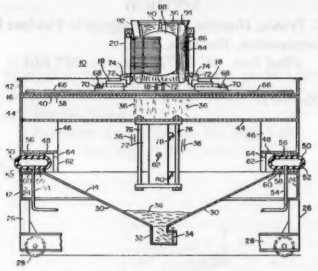
3,904,724
METHOD OF COMPACTING POWDERED RESIN INTO SLOTS OF MAGNETIC CORES

Harry P. Kipple, Pittsburgh, Pa.; Virgil J. Cozzarin, Clarence, N.Y., and Francis C. Kapperman, deceased, late of Eggertsville, N.Y. (by Dorothy M. Kapperman, administrator), assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 71,933, Sept. 14, 1970, Pat. No. 3,752,116. This application Mar. 30, 1973, Ser. No. 346,533
Int. Cl. B28b *1/08*
U.S. Cl. 264—71 **2 Claims**

1. A method of packing a heathardenable resin in the form of a non-fluidized powder into the slots and spaces of stators of various sizes comprising:

1. positioning a stator with its slots in a substantially vertical position;
2. pouring said resin into the top of said slots and spaces;
3. vertically vibrating said stator until said resin has substantially filled said slots and spaces to the extent that said slots and spaces are substantially fillable from the top;



4. halting said vibration;
5. turning said stator upside-down;
6. repeating steps (2), (3) and (4); and
7. heating said stator to fuse and cure said resin.

3,904,725

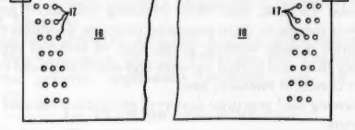
QUENCHING MOLTEN THERMOPLASTIC FILM

C. George Husky; Charles J. Resler, Jr., and Sidney C. Sanders, all of Circleville, Ohio, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 232,763, March 8, 1972, Pat. No. 3,779,682. This application May 14, 1973, Ser. No. 360,002

Int. Cl.² B29C *25/00;* **B29D** *7/08*

U.S. Cl. 264—89 **3 Claims**



1. In a process for quenching molten thermoplastic film by extruding the film onto a quenching surface and pinning each lateral edge of the film to the quenching surface, the improvement which comprises directing additional pinning force in a diagonal pattern beginning at the point at which the edges are pinned and extending in the direction of the film travel on the surface of the film at least over the thickened areas of the edge of the extruded film inward from each lateral pinned edge that are mobile and characterized by the highest temperature, such diagonal pattern on such film surface being determined by the movement of the thickened areas toward the center of the film as such thickened areas are transversely stretched to accommodate the shrinking of the film.

3,904,726

METHODS OF MANUFACTURING FIBROUS GRANULATES

Guy Jacquelin, Grenoble, and Jean Fournet, Saint-Romain-en-Gal, both of France, assignors to Societe d'Exploitation des Brevets Granofibre Sebreg, Ampuis, France

Filed July 13, 1973, Ser. No. 378,899

Claims priority, application France, July 21, 1972, 72.26426

Int. Cl.² B01J *2/12;* **D21C** *9/00*

U.S. Cl. 264—117 **11 Claims**

1. A method of manufacturing a fibrous granulate, which method comprises the steps of agitating resilient fibers which are dry on their surfaces and which have a moisture content of not mre than 55% of the total weight of the fibers under dry conditions, to initiate imbrication of the fibers in groups and form fibrous aggregates having relatively low cohesion; thereafter depositing on the surface of the fibrous aggregates a suitable liquid selected, in accordance with the fibers being treated, to form liquid menisci on the fibers; said depositing step comprising the step of spraying only a limited amount of liquid onto the fibrous aggregates which limited amount of liquid is just sufficient to form liquid menisci between the surfaces of the fibers of each aggregate at the crossing points of the fibers, thereby to deform the fibers and cause mechanical tightening and increased mechanical interengagement and cohesion of the fibers; and thence evaporating the liquid to intensify the tightening and increase the mechanical interengagement and cohesion of the fibers.

3,904,727

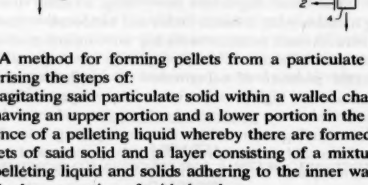
METHOD OF PELLETING CARBON BLACK

Robert E. Dollinger, Hurst, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 248,312, April 27, 1972, Pat. No. 3,779,683. This application Oct. 9, 1973, Ser. No. 404,636

Int. Cl. C09c *1/58*

U.S. Cl. 264—117 **5 Claims**



1. A method for forming pellets from a particulate solid comprising the steps of:

A. agitating said particulate solid within a walled chamber having an upper portion and a lower portion in the presence of a pelleting liquid whereby there are formed pellets of said solid and a layer consisting of a mixture of pelleting liquid and solids adhering to the inner walls of the lower portion of said chamber;

B. contacting the lower portion of said walled chamber with a gaseous fluid having a temperature sufficient to heat said lower portion to a temperature above the temperature of the upper portion;

C. passing a portion of said gaseous fluid through the inner wall of at least said lower portion of said walled chamber and into the interior thereof so as to bring said gaseous fluid into contact with at least a portion of said pelleting liquid in said layer of pelleting liquid and solids so as to vaporize at least a portion of said liquid so as to thereby cause said layer to be removed from the lower portion of said walled chamber; and thereafter

D. recovering the pellets of said particulate solid from said chamber.

3,904,728
METHOD OF PREPARING FIBRILS HAVING PROPERTIES FOR MAKING IMPROVED PAPER SHEETS

Joseph C. Davis, DeSoto; Francis R. Galiano, Overland Park, and Robert W. Hill, Leawood, all of Kans., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

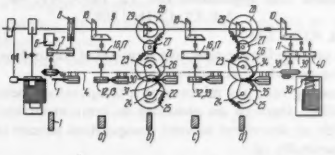
Filed Oct. 16, 1972, Ser. No. 298,085
Int. Cl.[2] B02C 18/00
U.S. Cl. 264—140 8 Claims

1. In a process for preparing fibrils which may subsequently be used to prepare paper sheets having improvements in tensile strength, tensile factor and stretch properties, comprising:
a. forming a heated solution of an olefin polymer having an inherent viscosity of at least 3.5 by dissolving said polymer in a heated hydrocarbon solvent,
b. subjecting said solution to a shearing action whereby the polymer molecules therein are oriented,
c. cooling said heated solution to a temperature below which said polymer solute is made to precipitate in the form of a solvent-swollen fibrous mass,
d. removing excess solvent from said fibrous mass,
e. cutting said fibrous mass into pieces of selected lengths, and
f. beating said cut fibrous mass into individual fibrils,
the improvement consisting essentially of:
g. incorporating in said solution of step (a) about 2–20% by weight, based upon said polymer, of a surfactant being partially soluble in an amount of up to at least 2% by weight in said heated solution, and being selected from the group consisting of nonionic surfactants and anionic surfactants, said nonionic surfactants having an HLB value from 7 to 12 and said anionic surfactants having an HLB value greater than 13.

3,904,729
METHOD OF MAKING KNITTING NEEDLES

Alexandr Dmitrievich Afanasiev, ulitsa Kubinka, 6; Alexei Gavrilovich Lykov, ulitsa Kubinka, 12, korpus 4, kv.30; Alexandr Moiseevich Mogilevsky, ulitsa Yablochkova, 41, kv. 27; Leonid Pavlovich Sokolov, ulitsa Slavyansky bulvar, 51/1, kv.174; Evl Gershkovich Fridman, ulitsa Kubinka, 6, kv. 20, and Fedor Matveevich Dergachev, ulitsa akademika pavlova, 21, kv. 77, all of Moscow, U.S.S.R.

Continuation of Ser. No. 237,190, March 22, 1972, abandoned. This application Apr. 2, 1974, Ser. No. 457,543
Int. Cl. B29c 17/00
U.S. Cl. 264—153 1 Claim

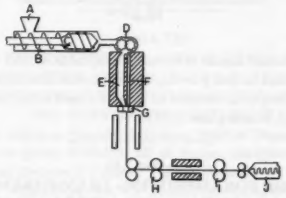


1. A method of making knitting needles which are oval-shaped in cross section, comprising the steps of: punching out a needle blank from a sheet stock; continuously moving said punched-out blank in the direction of the longitudinal axis; subjecting said needle blank, while it is being continuously moved to plastic deformation performed successively in two mutually perpendicular planes by compressing members having correspondingly shaped grooves in the perpheries thereof on the opposite sides of said blank and rotating said members in opposite directions so that said grooves thereof close upon said blank alternatively in said mutually perpendicular planes, in which said plastic deformation of said needle blank in said mutually perpendicular planes is performed by pairs of segments rotated in opposite directions, with said segments of each pair being disposed on the opposite sides of said blank, and said segments having grooves extending circumferentially in the respective peripheries thereof, said grooves being adapted to receive therein said blank.

3,904,730
PROCESS FOR THE PREPARATION OF POLYPROPYLENE CRIMPED FIBERS

Akira Shimizu, Iwakuni; Kyozi Ichihashi, Otake, and Motoyasu Yusawa, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industrie Ltd., Tokyo, Japan

Filed Jan. 26, 1970, Ser. No. 5,583
Claims priority, application Japan, Jan. 28, 1969, 44-5690
Int. Cl.[2] B29F 3/10; B32B 31/30
U.S. Cl. 264—171 18 Claims



1. In a process for the preparation of polypropylene crimped fibers by a process which comprises melting a starting polypropylene by heating, dividing the molten polypropylene into two flows, combining said two flows, spinning the combined flow into composite filaments and drawing said composite filaments, the improvement which comprises blending with the starting polypropylene 0.05 to 5 percent by weight of at least one phosphorus compound of the formula

$$(RO)(R'S)(R''Y)PY'_n$$

wherein R, R′ and R″ represent a group selected from hydrogen and alkyl groups of at least 6 carbon atoms, at least two of R, R′ and R″ being such alkyl groups; Y and Y′ each represent oxygen or sulfur; and n is 0 or 1,
melting the polypropylene containing said phosphorus compound at a temperature of 190° to 330°C., and maintaining the temperatures a residence times of said two flows within the ranges defined by the formulae:

$$200 \leq T_1, T_2 \leq 330,$$
$$t_1 - T_2 \leq 100$$
$$t_1/t_2 \leq 30 \text{ and}$$
$$\log t_1/t_2 \geq -0.01477\,(T_1 - T_2) + 0.738$$

wherein T_1 and t_1 represent respectively the temperature (°C.) and residence time (minutes) of one of the resin flows, and T_2 and t_2 represent respectively the temperature (°C.) and residence time (minutes) of one of the sesin flows, and the T_2 and t_2 represent respectively the temperature (°C.) and residence time (minutes) of the other resin flow.

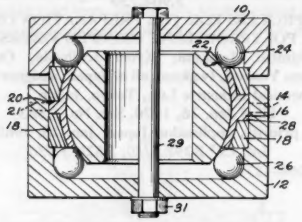
3,904,731
MOLDED PLASTIC BEARING ASSEMBLY

Stanley S. Orkin, Rockville, and Edward John Nagy, Windsor, both of Conn., assignors to Kamatics Corporation, Bloomfield, Conn.

Division of Ser. No. 241,007, April 4, 1972, Pat. No. 3,806,216. This application Nov. 8, 1973, Ser. No. 414,101
Int. Cl. B32b 1/10
U.S. Cl. 264—242 13 Claims

3. A method for producing a molded bearing assembly comprising two coengaging members movable relative to one another, the first of said members having a bearing surface selected from the group consisting of metal and ceramic and the bearing surface of said other member comprising a molded mixture of an acrylate composition which exhibits anaerobic curing characteristics and which is a liquid at ambient temperature and pressure and particulate solid lubricant, the bearing surface of said first member being coated with a thin film of

a parting agent to prevent adhesion thereof to said molded bearing surface, the steps comprising coating said first bearing member with a thin film of a parting agent, applying a curable



mixture of said liquid acrylate composition and particulate solid lubricant to the parting agent coated first bearing member and curing said mixture to produce said other member and said molded bearing assembly.

3,904,732

METHOD FOR IMPROVING TRANSPARENCY OF THERMALLY DAMAGED ACRYLIC GLAZING

Reyburn Wick, and Kenneth A. Green, both of Southampton, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 22, 1974, Ser. No. 516,857
Int. Cl.[2] B29C *25/00*
U.S. Cl. 264—341 3 Claims

1. Method for rapidly restoring temporary visibility thru acrylic glazing of military helicopters and the like, said glazing having been rendered opaque or frosted by laser radiation, said method comprising

suitably applying a mixture of liquid tetrachloroethylene and liquid trichloroethylene to said glazing such that the refractive index of said mixture approximates the refractive index of said acrylic glazing.

3,904,733

PREVENTION OF CALCIUM DEPOSITION FROM TRONA-DERIVED SODIUM CARBONATE LIQUORS

Alan B. Gancy, and Rustom P. Poncha, both of Syracuse, N.Y., assignors to Allied Chemical Corporation, New York, N.Y.

Filed June 20, 1973, Ser. No. 371,799
Int. Cl.[2] C01D *7/22*
U.S. Cl. 423—206 T 9 Claims

1. In a process for the production of soda ash from natural trona which comprises crushing the trona, calcining the crushed trona, dissolving the sodium carbonate values of the calcined trona in aqueous medium in a dissolving zone at a temperature of from about 80° to 110°C to provide a substantially saturated sodium carbonate solution containing soluble calcium ions and insoluble impurities, separating the insoluble impurities from said saturated sodium carbonate solution, crystallizing sodium carbonate monohydrate from said separated saturated sodium carbonate solution, separating the sodium carbonate monohydrate crystals and calcining the separated monohydrate crystals to produce soda ash, the improvement which comprises introducing pirssonite into said substantially saturated sodium carbonate solution, said pirssonite being introduced in an amount of between about 0.1 and 5% by weight, based on the weight of the dissolved calcined trona in the solution.

3,904,734

DECONTAMINATION OF GAS PURIFICATION PROCESS EFFLUENT

Derek Vernon Gosden; Anthony Roland Marshall, both of Horsham, and David George Robson, Crawley, all of England, assignors to Woodall-Duckham Limited, Crawley, England

Filed Dec. 18, 1973, Ser. No. 425,716
Claims priority, application United Kingdom, Dec. 22, 1972, 59405/72
Int. Cl.[2] C01B *17/16, 31/20*
U.S. Cl. 423—236 11 Claims

1. In a gas purification process in which at least one contaminant selected from the group consisting of H_2S and HCN is extracted from a foul gas stream by absorption in a liquid reagent, H_2S thereby being converted to sulphur and HCN to thiocyanate and the reagent being subsequently regenerated and recycled for absorption of further contaminant, the method of decontaminating the liquid reagent which comprises:

a. bleeding-off a sidestream of said liquid reagent;
b. reducing said sidestream in a bed of inert particles fluidized by a reducing gas at a temperature so as to produce substantially gaseous and solid products;
c. recycling the gaseous products of such reduction to the said foul gas stream; and
d. returning the solid products of said reduction to the said liquid reagent.

3,904,735

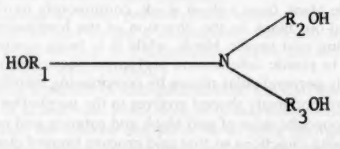
PROCESS FOR THE SELECTIVE REMOVAL OF SULFUR DIOXIDE FROM EFFLUENT GASES

Gilbert R. Atwood, Briarcliff Manor; Robert J. Blake, Yorktown Heights; Kenneth F. Butwell, Newburgh, and David A. Dunnery, New York, all of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 232,585, March 7, 1972, abandoned. This application Jan. 12, 1973, Ser. No. 322,985
Int. Cl. C01b *17/00*
U.S. Cl. 423—243 12 Claims

1. A process for the selective removal of sulfur dioxide from gas mixtures which comprises:

1. passing said gas mixture at a temperature below about 100°C. through an absorber in countercurrent contact with an absorbent solvent composition stream consisting essentially of:
a. about 50 to about 95% by weight of at least one nitrogen-containing compound having the formula:



wherein each of R_1, R_2 and R_3 is an alkylene group having from 2 to 4 carbon atoms
or the sulfite thereof, and
b. at least about 5% by weight of water, a an absorbent solvent composition flow to gas flow ratio such that the molar concentration of sulfur dioxide to be absorbed

therein does not exceed the molar concentration of water present;
2. absorbing sulfur dioxide in said solvent composition;
3. passing the absorbent solvent composition containing absorbed sulfur dioxide at a maximum temperature of about 115°C. to at least one stripping tower and stripping absorbed sulfur dioxide and water vapor from the solvent stream while maintaining the temperature in the stripper such that the temperature of the stripped lean solvent bottoms emerging from the stripper does not exceed about 125°C.;
4. removing from the stripper stripped lean solvent bottoms containing a maximum of about 20% by weight of sulfur dioxide and at least about 1 mol of water for each mol of sulfur dioxide remaining in said lean absorbent solvent;
5. recycling the stripped lean solvent bottoms from step (4) to the absorber together with sufficient water to provide an absorbent solvent composition having the same composition as that of step (1); and
6. removing from the stripper a vapor consisting essentially of sulfur dioxide and water.

3,904,736
PREPARING MICROSPHERES OF ACTINIDE NITRIDES FROM CARBON CONTAINING OXIDE SOLS

Leonard V. Triggiani, Hyattsville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Filed June 1, 1966, Ser. No. 554,345
Int. Cl. C01g *56/00;* **C01f** *15/00*
U.S. Cl. 423—251 **18 Claims**

1. A process for preparing nitrides, oxynitrides, and carboxynitrides of actinide metals and mixtures of actinide metals with other ions in microspheroidal form, which comprises:
a. Preparing carbon containing spheres of said actinide metal from the corresponding actinide metal oxide sol wherein the carbon to actinide metal ratio is in the range of 2.2 to 2.4, less than 2.1, greater than 2.4 to about 4.4 respectively;
b. Heating said spheres to a temperature of about 400°–600°C. in a reducing gas atmosphere to remove excess oxygen;
c. Sintering the spheres at a temperature of about 1400° to 1500°C. in an inert atmosphere to complete carbide formation;
d. Converting the carbide spheres to the nitride by heating in a nitrogen atmosphere;
e. Densifying the nitride spheres by heating in an inert atmosphere, and
f. Recovering the nitride microsphere product.

3,904,737
METAL CYANIDE COMPLEXES

Rene Antoine Paris, 152 Cours Gambetta, Lyon 7°, Rhone; Paul Alexis Amblard, 3, rue Julien Baudran, Bron, Rhone, and Abel Claude Rousset, 37 bis, rue Jean Moulin, Caluire, Rhone, all of France

Filed May 3, 1972, Ser. No. 250,079
Claims priority, application France, May 5, 1971, 71.17247; Oct. 15, 1971, 71.37942
Int. Cl. C01f *15/00, 17/00;* **C01b** *21/00*
U.S. Cl. 423—252 **8 Claims**

1. A metal-metal cyanide complex selected from the group which consists of: Mg [Mg $(CN)_4$], Be [Be $(CN)_4$], Al [Al $(CN)_6$], Ti [Ti $(CN)_8$], Zr [Zr $(CN)_8$], Th [Th $(CN)_8$], Y [Y $(CN)_6$], and Ln [Ln $(CN)_6$], wherein Ln represents a lanthanide element with an atomic number between 57 and 71 inclusive.

3,904,738
ZEOLITE RHO

Harry E. Robson, Baton Rouge, La., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed June 21, 1973, Ser. No. 372,231
Int. Cl.² C01B *33/28*
U.S. Cl. 423—328 **7 Claims**

1. A crystalline aluminosilicate zeolite having a composition, expressed in molar ratios of oxides, as follows:

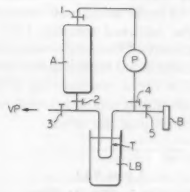
$$XNa_2O:(1-x)Cs_2O:Al_2O_3:Y\ SiO_2:Z\ H_2O$$

wherein X ranges from 0 to about 1, Y is from 5 to about 7 and Z is from 0 to about 10, said zeolite having an X-ray diffraction pattern corresponding to that shown for the (Na,Cs) form in Table II.

3,904,739
METHOD OF OXIDIZING AND/OR RECOLLECTING WATER- SOLUBLE AND/OR WATER-DECOMPOSABLE SUBSTANCES INCLUDED IN THE AIR AND APPARATUS FOR PERFORMING THE SAME

Hiromichi Uehara; Satoshi Arimitsu, both of Sagamihara, and Yasuharu Ijuin, Kodaira, all of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Filed Sept. 10, 1973, Ser. No. 395,844
Claims priority, application Japan, Sept. 13, 1972, 47-91189; Sept. 13, 1972, 47-91190
Int. Cl.² B01D *53/04;* **B01J** *1/14;* **C01B** *21/36*
U.S. Cl. 423—400 **5 Claims**



3. A method of oxidizing nitrogen monoxide in polluted air and collecting the resulting nitrogen dioxide, comprising the steps of sampling the polluted air in a first sample cell, adsorbing nitrogen monoxide contained in the sampled air on phosphorus pentoxide cooled to or below a temperature at which oxygen from the air is liquefied, reacting the oxygen with the nitrogen monoxide to thereby convert the nitrogen monoxide to nitrogen dioxide, trapping the resulting solid nitrogen dioxide in the phosphorus pentoxide under normal pressure, heating the phosphorus pentoxide to vaporize the nitrogen dioxide and collecting the vaporized nitrogen dioxide in a second sample cell.

3,904,740
CATALYST AND PROCESS FOR AMMONIA OXIDATION

Robert E. Kenson, Piscataway; Henry J. Albert, Colts Neck, and Dante J. Accinno, Edison, all of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

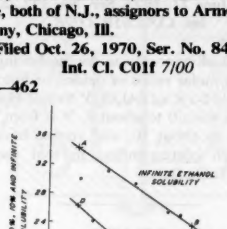
Continuation of Ser. No. 239,652, March 30, 1972, abandoned. This application Mar. 27, 1974, Ser. No. 455,127
Int. Cl. C01b *21/26*
U.S. Cl. 423—403 **5 Claims**

1. A process for producing oxides of nitrogen from ammonia comprising contacting a mixture of ammonia and an oxidizing gas at a catalytically effective temperature with a catalyst consisting essentially of an alloy of about 45.0 to 55.0% platinum, 30.0 to 40.0% palladium, 5.0 to 7.0% rhodium and 5.0 to 15.0% gold.

3,904,741
ALCOHOL SOLUBLE BASIC ALUMINUM CHLORIDES AND METHOD OF MAKING SAME

John L. Jones, North Plainfield, and Andrew M. Rubino, New Providence, both of N.J., assignors to Armour Pharmaceutical Company, Chicago, Ill.

Filed Oct. 26, 1970, Ser. No. 84,093
Int. Cl. C01f 7/00
U.S. Cl. 423—462 14 Claims

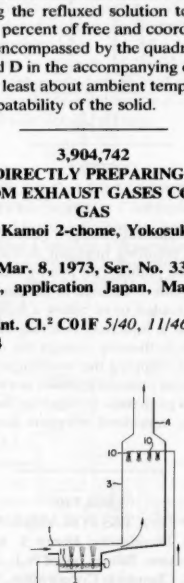


1. A method of preparing a two-thirds to five-sixths basic aluminum chloride solid having a high degree of solubility in alcohol comprising the steps of preparing an aqueous solution of two-thirds to five-sixths basic aluminum chloride, then heating the solution of basic aluminum chloride under reflux conditions, drying the refluxed solution to a solid having a calculated weight percent of free and coordinated water lying within the range encompassed by the quadrilateral defined by points A, B, C and D in the accompanying drawing, and cooling the solid to at least about ambient temperature to impede decreases in compatability of the solid.

3,904,742
METHOD FOR DIRECTLY PREPARING A SULFATE OR SULFATES FROM EXHAUST GASES CONTAINING SO_2 GAS

Ken Akimoto, 20 Kamoi 2-chome, Yokosuka, Kanagawa, Japan

Filed Mar. 8, 1973, Ser. No. 339,324
Claims priority, application Japan, Mar. 18, 1972, 47-27895
Int. Cl.² C01F 5/40, 11/46
U.S. Cl. 423—554 3 Claims



1. In a continuous cyclic process for producing alkali earth sulfates from an exhaust gas containing SO_2 which comprises passing said exhaust gas through a scrubbing zone while simultaneously passing a collecting solution through said zone, said collecting solution containing (a) at least one collector selected from the group consisting of calcium hydroxide, calcium carbonate, magnesium hydroxide, magnesium carbonate and dolomite together with (b) a manganese (II) salt, thereby forming calcium and/or magnesium sulfates in said zone as a result of said passage and the contacting of said exhaust gas with said collecting solution, recovering the formed sulfates from the collecting solution, and then recycling said collecting solution to said scrubbing zone while replenishing the collector in the recycling solution, the improvement comprising separating said scrubbing zone into two distinct zones one of which is an alkaline zone and the other an acidic zone, passing said exhaust gas first through said acidic zone and then through said alkaline zone while simultaneously passing said collecting solution first through said alkaline zone and then through said acidic zone, said manganese (II) salt being present in an amount sufficient to react with the oxygen in said collecting solution to form MnO_2 in said alkaline zone or in slight excess of said amount whereby a sulfate-free calcium and/or magnesium sulfite slurry is formed in said alkaline zone, and passing said slurry to said acidic zone wherein said MnO_2 acts to oxidize said sulfites to form said sulfates.

3,904,743
CONTINUOUS PROCESS FOR SCRUBBING SO_2 FROM A GAS STREAM AND MAKING SULFUR

Peter Urban, Northbrook, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Continuation-in-part of Ser. No. 156,183, June 24, 1971, Pat. No. 3,764,653, which is a continuation-in-part of Ser. No. 68,274, Aug. 31, 1970, Pat. No. 3,635,820. This application June 18, 1973, Ser. No. 371,199The portion of the term of this patent subsequent to Jan. 30, 1990, has been disclaimed.
Int. Cl. C01b 17/02
U.S. Cl. 423—567 19 Claims

1. A process for treating an input gas stream containing SO_2 in order to continuously remove SO_2 therefrom and to produce elemental sulfur, said process comprising the steps of:

a. contacting the input gas stream with an aqueous absorbent stream containing an alkaline reagent at scrubbing conditions selected to produce a treated gas stream containing a reduced amount of SO_2 and an effluent water stream containing a water-soluble sulfite compound;
b. contacting at least a portion of the effluent stream from step (a) with a first reducing agent, selected from the group consisting of finely divided sulfur, a polysulfide compound, a water-soluble sulfide compound and mixtures thereof, at thiosulfate production conditions selected to form a substantially sulfite-free effluent stream containing a thiosulfate compound;
c. reacting the effluent stream from step (b) with a water-soluble sulfide compound and second reducing agent, selected from the group consisting of carbon monoxide, hydrogen and mixtures thereof, at reduction conditions selected to result in an effluent stream containing a polysulfide compound;
d. subjecting at least a portion of the effluent stream from to form elemental sulfur, an H_2S-containing overhead stream and a regenerated aqueous absorbent stream; and thereafter;
e. passing at least a portion of the resulting regenerated aqueous absorbent stream to step (a).

3,904,744
PROCESS FOR THE PRODUCTION OF HYDROGEN-CONTAINING GASES

John F. Pagel, Rockaway, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Oct. 1, 1973, Ser. No. 402,301
Int. Cl. C01b 1/18
U.S. Cl. 423—652 11 Claims

1. A process for producing hydrogen, which comprises:

a. preheating a vaporized normally liquid hydrocarbon feedstock having a final boiling point at atmospheric pressure of not more than about 420°F. by mixing the same with superheated steam;
b. contacting the resulting preheated admixture in a first catalytic reforming zone with steam and a reforming catalyst under conditions to produce an effluent gas containing at least about 10 mole % methane (on a dry basis) together with hydrogen and carbon oxides;
c. contacting at least a portion of the first reforming stage effluent gas with additional steam and a second steam reforming catalyst in a second reforming stage positioned in the radiant section of a tubular steam reforming furnace under conditions to produce a hydrogen-rich gas;
d. converting water to superheated steam in the convection section of said reforming furnace;
e. passing at least a portion of the resulting superheated steam to step (a), and
f. recovering said hydrogen-rich gas from said second reforming stage.

3,904,745
SUSTAINED RELEASE OF CHLORPHENIRAMINE MALEATE

Arthur I. Cohen; James S. Y. Sim; Maurice H. Van Horn; Stanley E. Gordesky, and Stanley I. Gordon, all of Rochester, N.Y., assignors to Union Corporation, Verona, Pa.

Filed Sept. 10, 1973, Ser. No. 395,692
Int. Cl. A61k *27/12*
U.S. Cl. 424—22 **15 Claims**

1. A sustained release oral ingestion about 22 hour chlorpheniramine eluting pharmaceutical composition comprising:
A. a polymerized and cured matrix of a water-insoluble but water-swellable hydrophilic polymer of a monomer mixture containing:
1. polymerizable monoester of a member selected from the group consisting of acrylic acid, methacrylic acid, and mixtures thereof; and a polyhydric alcohol;
2. a polymerizable sulfur containing material selected from the group consisting of vinyl sulfonic acid, vinylpropane sulfonic acid, styrene sulfonic acids; alkali metal salts thereof; ammonium salts thereof; and mixtures thereof; and
3. polymerizable diester of a member selected from the group consisting of acrylic acid, methacrylic acid, and mixtures thereof; and a polyhydric alcohol; and
wherein the monomer mixture contains from about 25 to about 82% by weight of (1); from about 5 to about 30% by weight of (2); and from about 0.5 to about 25.2% by weight of (3) based upon the total weight of (1), (2), and (3) in the monomer mixture;
B. said polymerized and cured matrix having been soaked for about 12 hours in isotonic saline solution containing per 5 ml of isotonic saline solution at least about 99.9 mg of chlorpheniramine maleate in an amount at least sufficient for the total dosage requirement adapted to gradually elute upon oral ingestion during about 22 hours of a treatment period; and thereby entrapping the chlorpheniramine maleate in said matrix.

3,904,746
SYNERGIZED CARBAMIC ACID ESTER INSECTICIDAL COLLAR

Robert Aries, 69 rue de la Faisanderie, 75116 Paris, France

Filed Oct. 17, 1974, Ser. No. 515,677
Claims priority, application France, Oct. 17, 1973, 73.37118; June 21, 1973, 73.21639; Jan. 29, 1974, 74.02935; Mar. 13, 1974, 74.08534; Apr. 12, 1974, 74.12921; May 16, 1974, 74.17104
Int. Cl.² A01K *27/00, 29/00*
U.S. Cl. 424—28 **4 Claims**

1. In an animal collar having a buckel means attached thereto, for the control of fleas and ticks on cats and dogs, the improvement consisting of:
a solid non-volatile insecticidal composition which consists essentially of a mixture of a synergistically effective amount of a synergist and 5–20% of a carbamic acid ester selected from the group consisting of a 1-napthyl-N-methylcarbamate; a mixture of 1 part m-(1-ethylpropyl) phenyl methylcarbamate to 4 parts m-(1-methylbutyl) phenyl methylcarbamate; 2-dimethylamino-5, 6-dimethylpyrimidin-4-yl dimethylcarbamate; 4-methylthio-3,5-xylyl-N-methylcarbamate; 2-(1,3-dioxolan-2yl) phenyl-N-methylcarbamate; 2-isopropoxy-phenyl-N-methylcarbamate; 3-isopropyl-5-methylphenyl-N-methylcarbamate; and 4-dimethylamino-3-tolyl-N-methylcarbamate;
and said synergist being selected from the group consisting of piperonyl butoxide; piperonal bis[2-(2-butoxyethoxy) ethyl] acetal; 2-(2-ethoxyethoxy) ethyl 3,4-(methylene dioxy) phenyl acetal of acetaldehyde; 1,2-methylenedioxy-4-[2-(octylsulfinyl) propyl] benzene and dipropyl 5,6,7,8-tetrahydro-7-methyl naptho [2,3d]-1, 3-dioxole-5,6-dicarboxylate
in a plasticized solid thermoplastic vinyl resin, whereby said animal collar effectively contacts ectoparasites on the body of the ectoparasite infected animal during migratory movements of the ectoparasites from one part to another of the body of the ectoparasite infected animal.

3,904,747
DENTIFRICE COMPOSITIONS

Martin Cordon, Highland Park, and James Norfleet, Plainfield, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 109,596, Jan. 25, 1971, abandoned. This application July 20, 1972, Ser. No. 273,489
Int. Cl.² A61K *7/16*
U.S. Cl. 424—49 **5 Claims**

1. A dentifrice preparation comprising about 20 to about 50 percent by weight of particles of polyvinyl chloride and up to about 15 percent by weight of a cleaning and polishing material which cleaning and polishing material consists of (1) uncoated zirconium silicate having a particle size range up to 10 microns and (2) a second cleaning and polishing material which does not affect the desirable properties of the dentifrice; the zirconium silicate being present in an amount effective to clean and polish dental enamel up to about 10 percent by weight of the dentifrice and constitutes at least two-thirds of said cleaning and polishing material.

3,904,748
HAIR COSMETIC PREPARATION

Hans Werner Eckert, Dusseldorf; Peter Flemming, Oberhausen-Sterkrade, and Karl Giede, Dusseldorf, all of Germany, assignors to Therachemie Chemisch-Therapeutische Gesellschaft mbH, Dusseldorf, Germany

Filed Oct. 2, 1972, Ser. No. 294,188
Claims priority, application Germany, Oct. 18, 1971, 2151740
Int. Cl. A61k *7/06*
U.S. Cl. 424—70 **9 Claims**

1. A hair cosmetic preparation consisting essentially of a composition consisting essentially of (a) from about 0.1% to 10% by weight of an acylation product consisting essentially of (1) a natural protein having been reacted with an amine selected from the group consisting of diamine with 2 to 10 carbon atoms, polyamine with 2 to 10 carbon atoms and the mixtures thereof by heating said protein with at least an equal amount by weight of said amine at temperatures between 80°C and 200°C to produce a protein-aminolyzate, (2) said protein-aminolyzate having been reacted with an epoxide compound having 3 to 24 carbon atoms in the molar ratio of 1:(0.5 to 1.5) at elevated temperature to produce a protein-aminolyzate having at least one additional N-hydroxyalkyl substituent having from 3 to 24 carbon atoms, and (3) said protein-aminolyzate having said at least one substituent having been acylated with the acyl of a carboxylic acid having 10 to 24 carbon atoms with the amount of said carboxylic acid ranging

from about 0.5 to 1.5 mol per mol of said proteinaminolyzate at temperatures between 100°C and 150°C to produce said acylation product, (b) from 0% to about 50% by weight of a surface active component, (c) from 0 to about 5% by weight of a superfatting agent component, (d) from 0 to about 5% by weight of a thickener component, (e) from 0 to about 15% by weight of a builder component, (f) from 0 to about 10 % by weight of an emulsifier component, (g) from 0 to about 10% by weight of solution aid components, (h) from 0 to about 2% by weight of an acid additive component, (i) from 0 to about 2% by weight of a film forming component, (j) from 0 to about 7% by weight of other components selected from the group consisting of perfumes, preservatives, plant extracts and vitamin complexes, and (k) the balance up to 100% by weight of an aqueous preparation.

3,904,749
HAIR SETTING PREPARATIONS

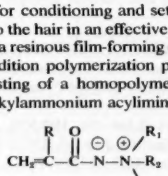
William J. McKillip, Worthington, Ohio, assignor to Ashland Oil, Inc., Ashland, Ky.

Division of Ser. No. 191,802, Oct. 22, 1971, abandoned. This application May 9, 1973, Ser. No. 358,579

Int. Cl.[2] A61K *7/06, 7/09*

U.S. Cl. 424—71 **7 Claims**

1. A process for conditioning and setting hair which comprises applying to the hair in an effective amount for imparting set to the hair of a resinous film-forming component consisting essentially of addition polymerization product selected from the group consisting of a homopolymer of an ethylenically unsaturated trialkylammonium acylimine of the formula:



in which R is H or CH_3; R_1 and R_2 are each alkyl, and R_3 is alkyl or hydroxyalkyl; and a copolymer of said trialkylammonium acylimine and a comonomer selected from the group of a vinyl ether, a vinyl monocarboxylic acid, a lower alkyl or hydroxyalkyl ester of a vinyl monocarboxylic acid, a vinyl amide, a vinyl alkanoate, vinyl alcohol and mixtures thereof, in admixture with a cosmetically acceptable carrier; said product being highly substantive to hair and forming stable hydrates with water.

3,904,750
PARAINFLUENZA VIRUS VACCINE FOR THE CONTROL OF CANINE TRACHEO-BRONCHITIS (KENNEL COUGH)

Florence S. Lief, Bala Cynwyd, Pa., assignor to The Trustees of the University of Pennsylvania, Philadelphia, Pa.

Continuation-in-part of Ser. No. 440,015, Feb. 6, 1974, abandoned. This application Dec. 18, 1974, Ser. No. 533,794

Int. Cl.[2] C12K *7/00*

U.S. Cl. 424—89 **25 Claims**

1. A method of producing an aqueous canine tracheobronchitis vaccine comprising the step of serially passaging a SV_5-like canine tracheobronchitis virus strain in a continuous-line mammalian kidney cell culture free of extraneous agents to produce said aqueous canine tracheobronchitis vaccine.

3,904,751
PROCESS FOR ISOLATING A FIBRIN STABILIZING FACTOR FROM HUMAN PLACENTA

Oswald Zwisler, Marbach near Marburg and der Lahn, and Hans Biel, Marburg an der Lahn, both of Germany, assignors to Behringwerke Aktiengesellschaft, Marburg an der Lahn, Germany

Continuation-in-part of Ser. No. 210,227, Dec. 20, 1971, abandoned. This application Jan. 17, 1974, Ser. No. 434,095

Claims priority, application Germany, Dec. 22, 1970, 2063070

Int. Cl.[2] A61K *27/00*

U.S. Cl. 424—105 **1 Claim**

1. A process for isolating a fibrin-stabilizing factor which comprises:

a. extracting human placentas with a dilute aqueous sodium chloride solution at a temperature between 0°C. and 10°C. and removing solid contaminants from the extract;
b. adding a dilute aqueous solution of diamino-ethoxy-acridine lactate to said extract at a temperature of 10°C. and at a pH between 5.0 and 7.5 in an amount furnishing about 6 to 10 grams of said lactate per 100 grams of protein content in said extract to form a first precipitate, and isolating said first precipitate;
c. dissolving said first precipitate at a temperature between 10°C. and 25°C. by treating it with from 1.5 to 3 percent of an alkali metal chloride in a neutral aqueous medium;
d. adding from 12 to 20 percent by volume of a lower alcohol to said aqueous chloride medium at a temperature from 10°C. to 25°C. to form a second precipitate, and isolating and discarding said second precipitate;
e. clarifying the remaining supernatant liquid, diluting it with water to an alkali metal chloride concentration below 2 percent, adding thereto from 12 to 20 percent by volume of a lower alcohol at a temperature between −5°C. and 5°C. at a pH from 5.5 to 6.5 to form a third precipitate, and isolating said third precipitate;
f. suspending said third precipitate at about 0°C. in a neutral ethylene diamine tetraacetic acid/alkali metal hydroxide buffer containing from 0.5 to 3 percent of sodium chloride, 0.2 to 2 percent of glucose, and 0.05 to 0.2 percent of sodium azide, and removing any insoluble matter;
g. gel filtering the resultant solution in a chromatographic column filled with a gel filtration medium with a fractionation range for linear molecules between molecular weights of 1000 to 150,000 and collecting the active fractions having an activity of more than 10 units of fibrin-stabilizing factor and combining them;
h. chromatographing said collected active fractions on diethylaminoethyl cellulose using a neutral 0.3 to 1.0 percent solution of sodium chloride containing from 0.05 to 0.5 percent of epsilon-amino-caproic acid as the eluant; and
i. dialyzing the eluate against a 0.01 to 0.02 percent neutral sodium phosphate buffer containing 0 to 2 percent of glucose and retaining the dialyzed eluate.

3,904,752
DISCHARGE RECORDING

Masamichi Sato, and Hajime Miyatuka, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation-in-part of Ser. No. 224,600, Feb. 8, 1972, abandoned. This application Nov. 6, 1973, Ser. No. 413,302

Claims priority, application Japan, Feb. 9, 1971, 46-5405

Int. Cl.[2] B44D *1/18*

U.S. Cl. 427—122 **16 Claims**

1. A discharge recording blank comprising a paper support having a black conductive surface, and a binderless powdered coating consisting of a non-conductive finely divided powder formed on said conductive surface wherein said powder is a pigment selected from the group consisting of organic pigment particles, inorganic pigment particles, resin particles or mixtures thereof, whereby said powdered coating is removed in localized areas in response to applied electric signals so as to expose said black conductive surface in high contrast.

3,904,753
CLINICALLY ACTIVE BOVINE GROWTH HORMONE FRACTION

Martin Sonenberg, New York, N.Y., and Nobuyuki Yamasaki, Matsuyama, Japan, assignors to Research Corporation, New York, N.Y.

Division of Ser. No. 13,162, Feb. 20, 1970, Pat. No. 3,664,925. This application Mar. 31, 1972, Ser. No. 240,301

Int. Cl.[2] A61K *37/00*

U.S. Cl. 424—177 **2 Claims**

1. A composition consisting essentially of the polypeptide obtained from the tryptic digest of bovine growth hormone by

diethylaminoethyl-cellulose chromatography to produce therefrom a homogeneous component as evidenced by disc-electrophoresis and sedimentation equilibrium, said component then subjected to dextran gel filtration in the presence of 50% acetic acid to produce said polypeptide, said polypeptide having a molecular weight of about 5,000 and a chain length of about 38 amino acids, the amino acid content of said polypeptide comprising about 2.0 lysine, about 2.8 arginine, about 3.8 aspartic acid and asparagine, about 2.6 threonine, about 1.9 serine, about 4.9 glutamic acid and/or glutamine, about 0.9 proline, about 2.9 glycine, about 1.0 alanine, about 3.0 valine, about 1.0 methionine, about 0.9 isoleucine, about 5.1 leucine, about 1.0 tyrosine, about 1.8 phenylalanine, having valine as the amino terminal amino acid and arginine as the carboxy terminal amino acid, and a carrier, said polypeptide present in said composition at a concentration of about 5 milligrams per milliliter.

3,904,754

THERAPEUTIC COMPOSITIONS CONTAINING LIPOPOLY (ALPHA-AMINO ACIDS)

Jean Valentin Morelle, 170 Avenue Parmentier, 75- Paris 10 eme., France

Division of Ser. No. 886,379, Dec. 18, 1969, Pat. No. 3,786,076, which is a continuation-in-part of Ser. No. 672,975, Oct. 5, 1967, abandoned. This application Mar. 14, 1973, Ser. No. 341,046

Claims priority, application France, Oct. 13, 1966, 66.79767; May 31, 1967, 67.108515; Dec. 20, 1968, 68.179384

Int. Cl.[2] A61K *31/22, 31/24, 31/40, 31/195, 31/215, 31/225, 31/415, 37/00*

U.S. Cl. 424—177 **3 Claims**

1. A therapeutic preparation for application to human skin comprising a compatible carrier and an effective amount of a water-insoluble, peptide-free lipo-soluble mixture of alpha-(fatty acid amido) carboxylic acids prepared by:

a. hydrolyzing a protein to produce a hyrolyzate;
b. removing the peptides from the hydrolyzate by a cation exchange method;
c. acylating the depeptided hydrolyzate with a compound selected from the group consisting of fatty acids and fatty acid halides having from 6 to 30 carbon atoms to form a mixture of acylated lipopoly (alpha-amino acids); and
d. subjected said acylated lipopoly (alpha-amino acids) to a compound selected from the group consisting of strong acids and cationic exchange resins to obtain a mixture of lipopoly (alpha-amino acids) corresponding to the said mixture of acylated lipopoly (alpha-amino acids).

3,904,755

ANTIBIOTIC SOLUTION

Mitsuhiro Takenaga, Machida, and Akira Okada, Kawasaki, both of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Dec. 28, 1971, Ser. No. 213,222

Claims priority, application Japan, Dec. 29, 1970, 46-121887

Int. Cl.[2] A61K *31/71*

U.S. Cl. 424—181 **4 Claims**

1. An aqueous antibiotic composition consisting essentially of an antibiotic effective amount of aminodeoxykanamycin, 1 – 10% of glycerine with the balance of the aqueous composition being water.

3,904,756

SUBSTITUTED NITROIMIDAZOLYL THIADIAZOLES AND OXADIAZOLES AS ANTIBACTERIAL AGENTS AND GROWTH PROMOTING COMPOUNDS

Gerald Berkelhammer, Princeton, and Goro Asato, Titusville, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 199,005, Nov. 15, 1971, Pat. No. 3,830,924, which is a continuation-in-part of Ser. No. 17,977, March 9, 1970, abandoned, which is a continuation-in-part of Ser. No. 814,205, April 7, 1969, abandoned, which is a continuation-in-part of Ser. No. 659,596, Aug. 10, 1967, Pat. No. 3,452,035, which is a continuation-in-part of Ser. No. 604,158, Dec. 23, 1966, abandoned. This application Apr. 25, 1974, Ser. No. 463,951

Int. Cl.[2] A01N *9/22;* **A61K** *31/495*

U.S. Cl. 424—250 **1 Claim**

1. A method for enhancing the growth rate of warm-blooded animals which comprises orally administering to said animals a growth promoting amount of 1-[5-(1-methyl-5-nitro-2-imidazolyl)-1,3,4-thiadiazole-2-yl]-4-(2-thiazolyl)piperazine.

3,904,757

TREATMENT OF PARKINSONISM

Irwin H. Slater, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Aug. 8, 1974, Ser. No. 495,613

Int. Cl.[2] A61K *31/48*

U.S. Cl. 424—261 **2 Claims**

1. The process for the treatment of Parkinsonism which comprises administering to a human suffering from Parkinsonism and in need of such treatment from 2–10 mg. per day orally of D-2-chloro-6-methyl-8-cyanomethylergoline or a pharmaceutically acceptable salt thereof formed with a non-toxic acid.

3,904,758

METHOD OF INCREASING WAKEFULNESS

Kjell Fuxe, Sollentuna, Sweden, assignor to Nelson Research & Development Co., Irvine, Calif.

Filed June 3, 1974, Ser. No. 475,858

Int. Cl.[2] A61K *31/445*

U.S. Cl. 424—267 **1 Claim**

1. A method for temporarily alleviating drowsiness or symptoms of hypersomnia in humans by administering to a human having such condition a composition comprising an effective amount of a compound selected from the group consisting of piperoxan and a pharmaceutically acceptable salt thereof together with a suitable pharmaceutical carrier.

3,904,759

CARBAMOYLOXYIMINO-AZOLIDINES AS MOLLUSCICIDES

Nazim Punja, Wokingham, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 478,043, June 10, 1974, which is a division of Ser. No. 250,119, May 4, 1972, Pat. No. 3,843,669. This application Dec. 18, 1974, Ser. No. 534,135

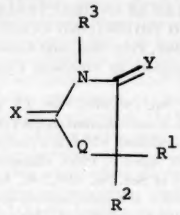
Claims priority, application United Kingdom, May 7, 1971, 13723/71

Int. Cl.[2] A01N *9/14, 9/22, 9/28*

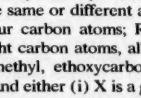
U.S. Cl. 424—270 **2 Claims**

1. A method of combating molluscs which comprises apply-

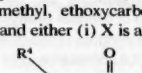
ing to said molluscs a molluscicidally effective amount of a compound of the formula



wherein Q is oxygen, sulphur, sulphoxide or sulphone; R^1 and R^2 which may be the same or different are hydrogen or alkyl containing up to four carbon atoms; R^3 is hydrogen, alkyl containing up to eight carbon atoms, allyl, benzyl, dimethylamino, methyl-thiomethyl, ethoxycarbonyl-methyl, or halo-substituted pyridyl; and either (i) X is a group of the formula:



where R^4 and R^5, which may be the same or different, are hydrogen, alkyl containing up to four carbon atoms, phenyl, chlorosubstituted phenyl, acetyl, chloromethyl, methoxymethyl, ethoxymethyl or ethylthiomethyl; and Y is oxygen, sulphur or alkylimino containing up to four carbon atoms; or (ii) Y is a group of the formula:



where R^4 and R^5, which may be the same or different, are hydrogen, alkyl containing up to four carbon atoms, phenyl, chlorosubstituted phenyl, acetyl, chloromethyl, methoxymethyl, ethoxymethyl or ethylthiomethyl; and X is oxygen. sulphur or alkylimino containing up to four carbon atoms.

3,904,760

METHOD OF CONTROLLING PESTS USING CERTAIN KETONES OF THIOPHENE

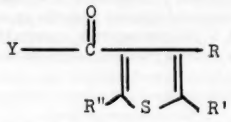
Zaven Stephen Ariyan, Woodbury; Robert Edward Grahame, Jr., Waterbury, and Winchester Loomis Hubbard, Woodbridge, all of Conn., assignors to Uniroyal, Inc., New York, N.Y.

Filed Nov. 13, 1972, Ser. No. 306,044

Int. Cl.[2] A01N 9/12

U.S. Cl. 424—275 **6 Claims**

1. A method of controlling acarids comprising applying to a locus, subject to attack by acarids, an effective acaricidal amount of a ketone of a substituted thiophene having the formula



wherein Y is selected from the group consisting of 2-thienyl and 3-(2,5-dichloro- or dibromothienyl),

R is hydrogen and R′ and R″ are chlorine or bromine.

3,904,761

METHOD OF PREVENTING THROMBOSIS

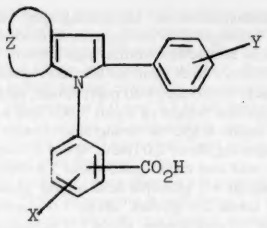
William J. Novick, Jr., Gwynedd, Pa., and Howard B. Lassman, Flemington, N.J., assignors to American Hoechst Corporation, Bridgewater, N.J.

Filed Jan. 25, 1974, Ser. No. 436,796

Int. Cl.[2] A61K 31/40

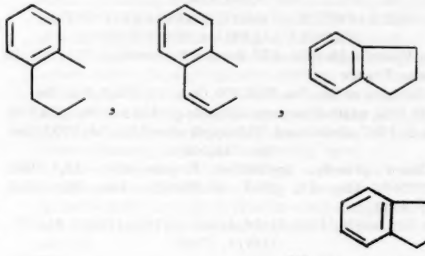
U.S. Cl. 424—274 **6 Claims**

1. A method of preventing thrombosis and inhibiting platelet aggregation in mammals which comprises administering to a mammal an effective amount of a compound of the formula:



wherein

X is hydrogen or hydroxy; Y is hydrogen, hydroxy, halogen, alkyl of one to four carbon atoms, alkoxy of one to four carbon atoms, or trifluoromethyl; and Z is alkylene of three to five carbon atoms, alkylene of three to five carbon atoms substituted by alkyl or alkoxy of one to four carbon atoms, divinylene, divinylene substituted by alkyl of one to four carbon atoms,



3,904,762

2-ARYLAMINONITROTHIOPHENES AS INSECTICIDES AND ACARICIDES

Karl Heinz Buchel, Wuppertal-Elberfeld, and Ingeborg Hammann, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

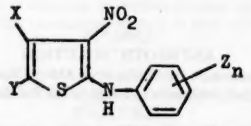
Division of Ser. No. 74,917, Sept. 23, 1970, Pat. No. 3,839,359. This application Apr. 12, 1974, Ser. No. 460,650

Claims priority, application Germany, Oct. 3, 1969, 1949915

Int. Cl.[2] A01N 9/00, 9/12

U.S. Cl. 424—275 **11 Claims**

1. A method of combating insects or acarids which comprises applying to the insects or acarids an insecticidally or acaricidally effective amount of a compound of the formula



in which

X represents hydrogen or nitro,

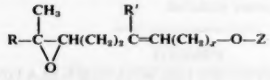
Y represents halogen, trifluoromethyl or nitro,

Z represents halogen, cyano, nitro, lower alkyl, halo-lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphinyl, lower alkylsulphonyl, cycloalkyl, dialkylamino wherein each alkyl group contains up to six carbon atoms or

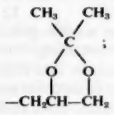
amino wherein the nitrogen is part of a saturated heterocyclic ring, and
n is an integer from 0 to 3.

3,904,763
SYNTHETIC TERPENOID COMPOUNDS FOR INSECT CONTROL
William S. Bowers, Geneva, N.Y., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.
Continuation of Ser. No. 78,577, Oct. 6, 1970, abandoned. This application Apr. 23, 1974, Ser. No. 463,331
Int. Cl.[2] A01N *9/28*
U.S. Cl. 424—278 **18 Claims**

1. A method of controlling the maturation of insects selected from the group consisting of *Tenebrio molitor* (L.) and *Epilachna varivestis* comprising applying to said insects at an immature stage of growth an effective maturation inhibiting amount of a compound of the formula



wherein R and R′ are straight chain alkyls containing from one to two carbon atoms; *x* is a number from 1 to 2; and Z is selected from the group consisting of

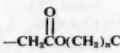


;

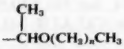
;

$$-CH_2CH_2-O(CH_2)_nCH_3$$

in which *n* is a number from 0 to 3;



in which *n* is a number from 0 to 1; and



in which *n* is a number from 0 to 2.

3,904,764
SLIMICIDAL COMPOSITIONS CONTAINING BIS (TRICHLOROMETHYL) SULFONE AND THEIR USE
Paul Swered, Philadelphia, and Bernard F. Shema, Glenside, both of Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.
Filed Jan. 30, 1975, Ser. No. 545,675
Int. Cl.[2] A01N *9/00, 9/14*
U.S. Cl. 424—298 **8 Claims**

1. A composition for the control of the microorganism *Aerobacter aerogenes* in aqueous systems comprising a mixture of 1,3-dichloroacetone oxime acetate and bis (trichloromethyl) sulfone wherein the weight ratio of the acetate to the sulfone ranges from about 95:5 to about 5:95 respectively.

3,904,765
PROCESS FOR CONTROLLING LAMELLAR DYSTROPHY OF FINGERNAILS
David W. Aiken, 2405 River Rd., Jefferson, La. 70121
Filed July 18, 1973, Ser. No. 380,472
Int. Cl. A61k *27/00*
U.S. Cl. 424—319 **6 Claims**

1. A method of controlling splitting fingernails and promoting growth of fingernails in humans which comprises orally administering to such humans an effective amount of an active ingredient consisting essentially of a salt of aspartic acid selected from the group consisting of sodium, potassium, calcium, magnesium and mixtures thereof.

3,904,766
TREATMENT OF PSORIASIS
Eugene J. Van Scott, 1138 Sewell Ln., Rydal, Pa. 19046, and Ruey J. Yu, 4400 Dexter St., Philadelphia, Pa. 19128
Filed June 19, 1973, Ser. No. 371,516
Int. Cl.[2] A61K *31/13, 39/00*
U.S. Cl. 424—325 **3 Claims**

1. A method for alleviating the symptoms of psoriasis in humans suffering therefrom comprising the steps of:
inducing an immunological tolerance to mechlorethamine hydrochloride by successively injecting, intraveneously, about 200 micrograms thereof in an aqueous solution once weekly for at least three weeks; and
subsequently applying, topically, to involved areas of the human body an effective amount of a composition containing mechlorethamine hydrochloride in a concentration of from 0.01 to 0.05 percent, by weight, of the total composition, in an anhydrous pharmaceutically acceptable carrier.

3,904,767
PREPARING MARGARINE CONTAINING VIABLE BACTERIAL CELLS HAVING ALCOHOL-DEHYDROGENASE ACTIVITY
Cornelis Theodorus Verrips, Merellaan, and Hendrik Vonkeman, Maassluis, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.
Filed Dec. 13, 1973, Ser. No. 424,494
Claims priority, application Netherlands, Dec. 15, 1972, 7257938
Int. Cl. A23d *3/00*
U.S. Cl. 426—33 **4 Claims**

1. A process for preparing margarine which comprises emulsifying 75 to 85% of a fatty phase containing triglycerides of a polyunsaturated fatty acid with a balance of a milk based aqueous phase having a pH value of 4.5 to 7 and containing viable bacteria cells of the group consisting of leuconostocs and streptococci, said bacteria having been grown for at least three times in a nutrient medium containing lactose and/or citrate and 1 to 7% of common salt, the aqueous phase of the margarine containing at least 10^5 per ml of said viable bacterial cells after 12 days storage.

3,904,768
METHOD OF INCREASING PROTEIN CONTENT OF A WASTE FOOD PRODUCT
Frank J. Hruby, 2809 Tillmadge Rd., Ravenna, Ohio 44266
Continuation-in-part of Ser. No. 397,072, Sept. 13, 1973, Pat. No. 3,870,798, which is a continuation-in-part of Ser. No. 70,763, March 9, 1970, Pat. No. 3,787,583, which is a continuation of Ser. No. 550,798, May 17, 1966, abandoned. This application May 8, 1974, Ser. No. 468,016
Int. Cl.[2] A23K *1/10*
U.S. Cl. 426—53 **5 Claims**

1. A process of increasing the protein content of a waste food product suitable for livestock feed, selected from the group consisting of bagasse, citrus pulp and beet pulp, consisting essentially of the steps of:

a. first comminuting said food product;
b. adding urea, ammonium sulfate, sulphamide or ammonium nitrate to the waste food product in an amount effective to significantly increase the protein content thereof after processing and mixing it therewith;
c. cooking a batch of the feed product in a pressure vessel at pressure above atmospheric and at temperatures above 212° Fahrenheit for a sufficient time to sterilize and liquefy said batch,
d. thereafter cooling the batch to a temperature below 150° Fahrenheit,
e. adding a fermenting agent to the cooled batch,
f. then fermenting the entire liquefied batch until emission of carbon dioxide substantially stops, and
g. subsequently drying said fermented batch.

3,904,769

STRUCTURED PRODUCTS HAVING CONTROLLED GAS-GENERATED CELLS THEREIN AND METHODS OF MAKING THEM

Louis Sair, Evergreen Park, and Donald W. Quass, Downers Grove, both of Ill., assignors to The Griffith Laboratories, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 376,685, July 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 285,422, Aug. 31, 1972, which is a continuation-in-part of Ser. No. 77,720, Oct. 2, 1970. This application May 15, 1974, Ser. No. 469,940

Int. Cl. A23j *3/00*

U.S. Cl. 426—104 **45 Claims**

1. A ballon-puffed, structured proteinaceous product having steam-generated cells therein and a three-dimensional network structure characterized by disulfide bonding, which network structure remains significantly intact following retorting.

21. The method for preparing a structured proteinaceous product which comprises:

continuously pressing a column of hot, viscous, proteinaceous mass containing a volatile liquid component through and from an elongated die assembly, the temperature of the viscous mass being below the applicable boiling point of the volatile liquid component during passage through an initial, upstream portion of the die assembly, and being controlled to be slightly above the applicable boiling point of the volatile liquid as it emerges from the die assembly, so that ballon-puffing occurs to produce a structured product.

3,904,770

PROCESS OF TREATING MEAT

Michael John Hale, Clifton, and Arthur Ernest Hawkins, Bedford, both of England, assignors to Lever Brothers Company, New York, N.Y.

Filed Dec. 11, 1972, Ser. No. 313,713

Claims priority, application United Kingdom, Dec. 10, 1971, 57387/71

Int. Cl.² A23L *1/31*

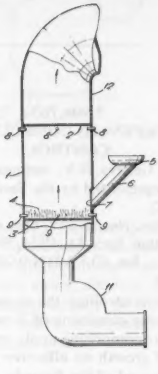
U.S. Cl. 426—645 **9 Claims**

1. A process of obtaining cooked meat fibres substantially free from coarser material which comprises:

A. rubbing or abrading cooked meat to form a loose mass of fibrous and coarse material of a bulk density of 0.2 – 0.45 grams/cm³

B. exposing said mass to an ascending stream of air or nitrogen of sufficient velocity to promote alignment of the fibrous material

C. separating the fibrous material from the coarser material by carrying the fibrous material by means of the ascending stream through a screen which is substantially impervious to the coarser material.



3,904,771

PREPARATION OF WATER SOLUBLE GELATIN

Thomas H. Donnelly, Western Springs, Ill., and Robert S. McGinnis, Wenham, Mass., assignors to Swift & Company, Chicago, Ill.

Filed Sept. 17, 1973, Ser. No. 398,152

Int. Cl. A23l *1/04, 1/06*

U.S. Cl. 426—576 **12 Claims**

1. A method of preparing cold water soluble gelatin comprising: forming an aqueous solution containing from about 1-15% solids, said solids comprising gelatin and from about 30% to 200% by weight of the gelatin of an edible organic acid selected from the group consisting of citric acid, malic acid, ascorbic acid, tartartic acid, and mixtures thereof; and thereafter spray-drying this solution to obtain a powder.

3,904,772

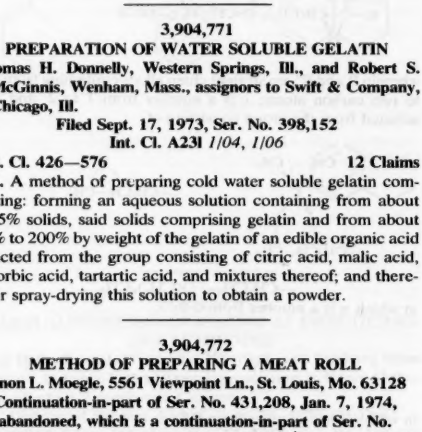
METHOD OF PREPARING A MEAT ROLL

Vernon L. Moegle, 5561 Viewpoint Ln., St. Louis, Mo. 63128

Continuation-in-part of Ser. No. 431,208, Jan. 7, 1974, abandoned, which is a continuation-in-part of Ser. No. 271,010, July 12, 1972, abandoned. This application Dec. 9, 1974, Ser. No. 530,552

Int. Cl.² A23L *1/31*

U.S. Cl. 426—293 **4 Claims**



1. A method of preparing a meat roll, comprising the steps of:

slicing a wafer-thin slice of raw meat;

dipping the slice of raw meat in vegetable cooking oil and thus coating the slice on all sides with vegetable cooking oil;

placing the oil-coated slice of raw meat on a mixture of bread or cracker crumbs and grated cheese and coating the surfaces of said slice of raw meat with a uniform layer of said mixture adherent to the oil-coated slice of raw meat; applying a coating of flavoring material consisting of finely chopped onions and tomatoes along only one of the short marginal edges of said coated slice of raw meat;

and tightly rolling said coated slice of raw meat lengthwise about the flavor-coated short marginal edge to form a meat roll with the coating of flavoring material disposed at the center of the meat roll and wherein the ingredients of the mixture are uniformly distributed throughout said meat roll.

3,904,773

ARTHROPOD MATURATION INHIBITORS

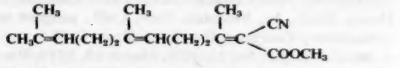
Meyer Schwarz, Kensington; Philip E. Sonnet, Bowie, and Nobel Wakabayashi, New Carrollton, all of Md., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Division of Ser. No. 104,781, Jan. 7, 1971, Pat. No. 3,824,319. This application Jan. 24, 1974, Ser. No. 436,239

Int. Cl.[2] A01N *9/06, 9/20*

U.S. Cl. 424—304 **1 Claim**

1. A method of preventing the maturation of Tenebrio molitor pupae comprising applying to said pupae an effective maturation inhibiting amount of a compound of the formula



3,904,774

FOOD PRESERVING PROCESS

Henry A. Dymsza, East Greenwich, R.I., assignor to Board of Regents for Education of the State of Rhode Island, Providence, R.I.

Continuation of Ser. No. 174,191, Aug. 23, 1971, abandoned. This application Aug. 17, 1973, Ser. No. 389,242

Int. Cl.[2] A23D *7/00*

U.S. Cl. 426—321 **13 Claims**

1. A process for preserving pieces of food material comprising the steps of:

a. Immersing said food pieces, while they still comprise their cell-moisture content, into a liquid treating medium consisting essentially of 1,3-butanediol or a mixture of 1,3-butanediol and 1,3-propanediol;

b. Simultaneously dehydrating said food pieces and infusing said treating medium into said food pieces while they are immersed in said treating medium to achieve a net weight loss between about 20–80 percent, said steps of immersing and dehydrating the food pieces being carried out at a temperature of from about 40°–120°C and the treatment time being less than about one hour;

c. Removing said food pieces from said treating medium; and

d. Removing any excess residual liquid-treating medium from the surface of said food pieces to provide food pieces containing infused therein from about 2.0 to 30 percent by weight of said 1,3-butanediol or of 1,3-butanediol and 1,3-propanediol mixture.

3,904,775

PROCESS FOR PRODUCTION OF A SIMULATED MEAT PRODUCT

Charles C. Harwood, Elgin, and George M. Smith, Jr., Crystal Lake, both of Ill., assignors to The Quaker Oats Company, Barrington, Ill.

Filed Aug. 22, 1973, Ser. No. 390,365

Int. Cl.[2] A23J *3/00*

U.S. Cl. 426—641 **8 Claims**

1. In a process for preparing puffed food products simulating meat, said process comprising:

a. mixing a material comprising at least 30 percent by weight protein with water sufficient to provide a moisture content after conversion to a plastic condition and extrusion without puffing of from about 15 percent to about 40 percent by weight;

b. subjecting the mixture of material and water to shear sufficient to convert it into a plastic condition;

c. extruding the plastic mixture in a uniform linear flow as an extrudate into a medium of lower pressure without puffing;

d. placing the extrudate in a confined space;

e. subjecting the extrudate to a temperature of at least 212°F. and superatmospheric pressure; and

f. suddenly releasing the pressure on the extrudate to cause it to puff and resemble simulated meat; the improvement in the extruding of the plastic mixture in a uniform linear flow comprising: after extruding the plastic mixture into a medium of lower pressure without puffing and before placing the extrudate in the confined space and while maintaining the mixture in a plastic condition, forming the mixture into an annular shape, cooling both the interior and exterior of the annular form, further extruding the cooled plastic mixture in the annular form, and thereafter subdividing the cooled annular form.

3,904,776

METHOD OF FORMING A SHAPED HEAT SET FOOD ARTICLE

Pete Joseph Magnino, Jr., Plano, Tex.; William B. Burgess, St. Louis, Mo., and Richard R. Meyer, Brownsville, Tex., assignors to Ralston Purina Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 258,095, May 30, 1972, abandoned. This application Feb. 7, 1974, Ser. No. 440,436

Int. Cl.[2] A23J *3/00*

U.S. Cl. 426—641 **5 Claims**

1. The method of forming a shaped heat set food article in the absence of extraneous binders comprising: forming heat settable protein fibers by heating a reactive slurry of proteinaceous material in a heat exchange zone sufficient to produce the protein fibers and continuously removing the heated slurry and protein fibers from the zone through an orifice to a collecting zone whereby the protein fibers are recovered, chopping the heat settable fibers into discrete particles substantially all of which are from about 0.125 to 1.0 inches long, blending the chopped fibers with edible animal tissue, to form a substantially uniform mixture which consists essentially of between about 5 and 60% by weight of the heat settable protein fibers, between about 30 and 90% by weight of edible animal tissue, flavoring materials and seasoning, forming the mixture into shaped pieces, followed by heat setting of the shaped pieces by heating to an internal temperature of between about 120° and 250°F to heat set the fibers.

3,904,777

PROCESS FOR CONTINUOUSLY PRODUCING A ROASTED COCOA MASS AND FOR MANUFACTURING A CHOCOLATE MASS

Paul Martin Goerling, and Klaus Paul Ernst Zuercher, both of Hannover, Germany, assignors to Nabisco, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 120,596, March 3, 1971, abandoned. This application Dec. 4, 1972, Ser. No. 311,664

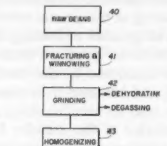
Claims priority, application Germany, July 21, 1970, 2036202

Int. Cl.[2] A23G *1/02*

U.S. Cl. 426—631 **35 Claims**

1. In a process for continuously producing a roasted cocoa composition, wherein the shells of raw cocoa beans are removed prior to crushing the beans into a relatively liquid cocoa mass, whereupon the liquid cocoa mass is roasted under pressure, the upper limit of which is atmospheric pressure, by means of indirect heat application for heating the cocoa mass to a maximum of 150°C, the improvement consisting of arranging a smooth, cylindrical surface substantially vertically, applying the liquid cocoa mass as a continuous thin layer to said smooth, cylindrical surface at the upper end thereof, whereby the liquid cocoa mass advances downwardly in the form of said continuous thin layer while maintaining said

smooth surface at a temperature of between about 100°C and 140°C for roasting said liquid thin layer cocoa mass, passing a gaseous or vaporous counter-current flow over said advancing thin layer liquid cocoa mass, whereby one side of said thin layer liquid cocoa mass is subjected to said temperature of between about 100°C to 140°C while the other side of said thin layer cocoa mass is simultaneously exposed to and in



intimate contact with said gaseous or vaporous counter-current flow for effectively degassing from the cocoa mass, as it is being roasted, volatile components which adversely affect the flavor and aroma, continuously removing said thin layer of roasted cocoa mass from said smooth surface at the lower end thereof and simultaneously cooling the roasted cocoa mass to a temperature having an upper limit of 80°C whereby after roasting effects are avoided.

3,904,778

METHOD FOR STORING AND COOKING FOOD

Thomas S. Shevlin, White Bear Lake, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 344,830, March 26, 1973, Pat. No. 3,784,787, which is a continuation-in-part of Ser. No. 173,414, Aug. 20, 1971, Pat. No. 3,736,981. This application Oct. 15, 1973, Ser. No. 406,574

Int. Cl.[2] A23L *1/00;* A23C *3/04*

U.S. Cl. 426—418 1 Claim

1. A method for storing food in a plurality of individual casseroles and during storage cooking food in selected casseroles while continuing to store uncooked food in the remaining casseroles comprising:

a. placing refrigerated entree food in thermally insulated individual casseroles each having an integral heating element which when selected to cook the food is connected to an electric circuit controlled by a timer to energize said element of said selected casseroles in predetermined on and off intervals to cook food in said selected casseroles by means of the heat generated by said heating element;

b. placing refrigerated side dish food in thermally insulated individual casseroles which are unconnected to electric circuit;

c. placing said individual casseroles in spaced-apart relationship on a tray;

d. storing the food in said casseroles on said tray for a period of from about 15 minutes to about 3 hours; the thermal insulation of each of said casseroles and the temperature levels of the refrigerated entree foods and the refrigerated side dish food as placed in said casseroles preventing degradation of said food during storage of same;

e. during said storage period, cooking entree food in selected casseroles for a period of about 18 minutes by energizing said heating elements of said selected casseroles by means of said electric circuit and timer in on intervals of 10 seconds followed by off intervals of 15 seconds duration; and

f. during said cooking period retaining on said tray entree food in unselected individual casseroles the heating element of which are not connected to said circuit and said refrigerated side dish food in said individual casseroles which are unconnected to said circuits, the thermal insulation of said casseroles and the temperature levels of said refrigerated entree food and said refrigerated side dish food as placed in said casseroles preventing degradation of the food in said casseroles during said cooking period.

3,904,779

WASHING AND COOLING COTTAGE CHEESE CURD

Horace Hinds, Jr., Mountain View, Calif., assignor to Grace Machinery Company, Inc., Santa Rosa, Calif.

Division of Ser. No. 126,079, March 19, 1971, Pat. No. 3,791,630. This application July 2, 1973, Ser. No. 375,820

Int. Cl.[2] A23C *19/02;* A23L *1/00*

U.S. Cl. 426—431 9 Claims

4. In a process for washing cottage cheese curd utilizing an upright enclosed tank having a cylindrical side wall and a bottom wall with a conically raised central portion disposed coaxially of the side wall and an annular outer portion at the bottom of the tank between the raised portion and the lower portion of the side wall, the steps of: introducing curd in a direction tangential to the tank side wall into the annular outer portion of the tank through an inlet passageway tangential to the cylindrical side wall in the lower portion of the side wall, introducing a washing fluid into the lower portion of the tank in a direction generally tangential to the side wall, passing the washing fluid upwardly through the curd, removing the washing fluid from near the top portion of the tank, and discharging the washed curd from the annular outer portion at the bottom of the tank in a direction generally tangential to the side wall.

5. In a process for washing cottage cheese curd utilizing an upright tank having an enclosed washing chamber with a cylindrical side wall and a downwardly extending conical bottom wall disposed coaxially of the side wall with an inlet and outlet passageway at the apex of the bottom wall, the steps of: introducing curd into the chamber through the passageway at the apex of the bottom wall of the tank, introducing a washing fluid from outside the tank into the lower portion of the chamber through a plurality of inlets in the bottom wall, passing the washing fluid upwardly through the curd, removing the washing fluid from near the top of the chamber, and discharging the washed curd through the passageway at the apex of the bottom wall.

3,904,780

METHOD FOR GIVING AND INCREASING THE FLAVOR RESEMBLING TO DAIRY PRODUCT

Ryo Yamamoto; Izuru Yamamoto, both of Tokyo, and Takumi Yoshizawa, Hara-Mura, all of Japan, assignors to Suntory Ltd. and Shiono Koryo Kaisha Ltd., both of Osaka, Japan

Filed May 30, 1973, Ser. No. 365,134

Int. Cl.[2] A23L *1/226*

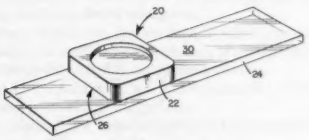
U.S. Cl. 426—534 14 Claims

1. A composition comprising a dairy product and a ketone containing flavoring material wherein the sole ketone is 8-nonene-2-one and wherein said ketone comprises from 0.2 to about 100 parts per million of said composition.

3,904,781
METHOD OF PREPARING CELLS FOR INSPECTION

Donald E. Henry, 983 Memorial Dr., Cambridge, Mass. 02138

Filed Oct. 15, 1973, Ser. No. 406,251
Int. Cl.² G02B 21/34; A01N 1/00
U.S. Cl. 427—2 18 Claims



1. A process for preparing cells for microscopic examination comprising the steps of

a. forming a suspension of said cells in a liquid medium;

b. forming a pool of said suspension on a display surface and within walls defining said pool, said pool being formed to a depth effective to allow thermal convection currents therein;

c. evaporating the liquid medium at a rate effective to induce thermal currents in said pool during said evaporation, said currents circulating said cells and distributing them substantially uniformly within an area defined by said walls;

d. and, upon evaporation of said liquid medium, leaving said cells uniformly dispersed upon said surface.

12. A process as defined in claim 11 wherein said pool is formed by placing a wall-forming ring open at top and bottom thereof on a transparent slide and placing said suspension in said ring.

3,904,782
METHOD TO IMPROVE THE ADHERANCE OF METAL FILMS DEPOSITED ON GLASS SUB-STRATES

Daniel I. Pomerantz, Lexington, Mass., assignor to P. R. Mallory & Co., Inc., Indianapolis, Ind.

Continuation of Ser. No. 197,136, Nov. 9, 1971, abandoned.
This application Nov. 8, 1973, Ser. No. 414,048
Int. Cl.² C03C 21/00
U.S. Cl. 427—12 6 Claims

1. In a method wherein a metal taken from the class consisting of gold and aluminum is deposited on a glass substrate, the improvement comprising:

applying an electrical potential at a current density of from about 2–8 microamps per square milimeters across said metal film and said glass substrate so as to render said metal positive and said glass substrate negative while maintaining at least said glass substrate at a temperature at which said glass substrate is slightly conductive for a period of from about 1 to 10 minutes so as to improve the adherence of said metal film to said glass substrate.

3,904,783
METHOD FOR FORMING A PRINTED CIRCUIT

Shigeo Nara, and Kentaro Matsuyama, both of Mito, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Continuation of Ser. No. 196,330, Nov. 8, 1971, abandoned.
This application Mar. 20, 1974, Ser. No. 453,093
Claims priority, application Japan, Nov. 11, 1970, 45-98720
Int. Cl.² B44D 1/18; G03C 5/04
U.S. Cl. 427—54 5 Claims

1. In the method of forming a printed circuit by coating a metal organic salt on an insulating substrate, activating said metal salt by ultraviolet rays so as to deposit a metal on the insulating substrate and subsequently electrolessly metallizing thereon, the improvement which comprises coating the surface of the insulating substrate with a solution of silver glutamate in a mixed solvent selected from the group consisting of an alcohol-water-ammonia mixture and an alcohol-water-ethylene diamine mixture, to form a photosensitive layer of said silver glutamate thereon; irradiating the desired portions of said layer with ultraviolet rays having a wave length shorter than 350mμ and in a quantity of irradiated light of at least 8×10^7 erg/cm² so as to deposit silver metal at the desired portions; removing the non-irradiated silver glutamate and organic acid liberated by irradiation; and carrying out the electroless plating utilizing the deposited silver as the plating nuclei.

3. A method as claimed in claim 2, wherein removal of non-irradiated silver glutamate and liberated glutamic acid are carried out by using said mixed solvent.

3,904,784
SEMICONDUCTOR WAFER CORROSION PROTECTION AND SOLUTION THEREFOR

Dervin L. Flowers, Scottsdale, and V. Louise Rice, Phoenix, both of Ariz., assignors to Motorola, Inc., Chicago, Ill.

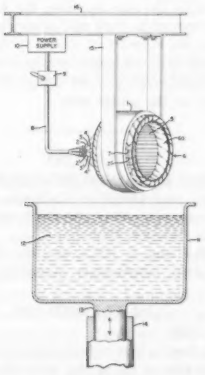
Filed Dec. 26, 1973, Ser. No. 428,499
Int. Cl.² C23C 3/02; B44D 1/18
U.S. Cl. 427—82 4 Claims

1. In a process of manufacturing semiconductor devices which includes the steps of forming P-N junctions in a surface of a semiconductor substrate which junctions extend to the surface of said substrate and covering said junctions with a passivation layer on the surface of said substrate, the improvement which consists of the step of coating the semiconductor device with a complex containing solution consisting essentially of 1 to 30 grams per liter phosphorous pentoxide, 1 to 60 grams per liter boric anhydride, 0.005 to 10.0 grams per liter of a material selected from the group consisting of the salts and oxides of gold, platinum, palladium, and rhodium, and the balance, a solvent selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, and isobutyl alcohol, ethylene glycol, and tetrahydro furfuryl alcohol.

3,904,785
METHOD FOR INSULATING ELECTRIC ARMATURE WINDINGS

Frederick William Baumann, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jan. 11, 1974, Ser. No. 432,673
Int. Cl.² B44D 1/42
U.S. Cl. 427—120 12 Claims



1. A method of insulating an electrical conductor comprising the steps of:

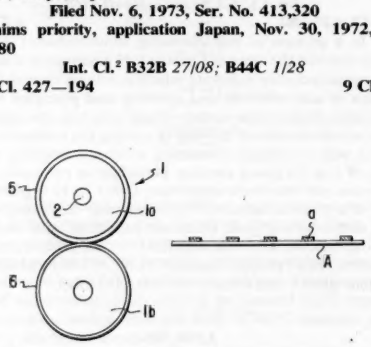
a. providing a bath of thermosetting epoxy varnish,
b. immersing an electrical conductor in the epoxy varnish,
c. passing an electric current through the immersed conductor, thereby to establish a current density in the range of 8,000 to 30,000 amperes per square inch of conductor cross-section in the conductor, to rapidly heat it and the epoxy varnish closely adjacent thereto,
d. continuing the heating operation of step (c) until a layer of varnish having a thickness in the range of 5 to 100 mils has gelled on said conductor,
e. discontinuing the passage of current through the conductor and removing it from the bath, and
f. curing the gelled layer of varnish to form a hard finish on the conductor.

3,904,786

PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR

Koichi Takiguchi, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1973, Ser. No. 413,320
Claims priority, application Japan, Nov. 30, 1972, 47-119380
Int. Cl.² B32B *27/08*; B44C *1/28*
U.S. Cl. 427—194 **9 Claims**



1. A process for fixing images by contact heating in a duplicator comprising
passing a thermoplastic resin powder image formed on a support between at least two heating rollers disposed in proximity to each other
heating the roller disposed on the image side of said support to a high enough temperature to soften said thermoplastic resin powder image when in contact therewith and heating the roller disposed on the side opposite the image side to a temperature high enough to melt said thermoplastic resin powder image through the support so that a temperature gradient is produced in said thermoplastic resin powder image to prevent said thermoplastic resin powder image from adhering to the roller disposed on the image side.

3,904,787

PROCESS FOR HYDROPHOBIZATION OF SILICATES

Karl Trebinger, and Gottfried Kallrath, both of Wesseling, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Germany

Filed Aug. 6, 1973, Ser. No. 385,733
Claims priority, application Germany, Aug. 31, 1972, 2242728
Int. Cl.² B05D *1/00*
U.S. Cl. 427—220 **16 Claims**

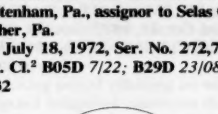
1. A process for the hydrophobization of a silicate of a metal of Group II to Group IV of the periodic system comprising reacting the free hydroxyl groups of the silicate in the form of an aqueous suspension of a precipitate thereof with an organohalogenosilane with intensive stirring at a temperature of 15° to 70° C, and drying the treated silicate.

3,904,788

METHOD OF PLACING MEMBRANE ON SUPPORT

Emil Blaha, Cheltenham, Pa., assignor to Selas Corporation of America, Dresher, Pa.

Filed July 18, 1972, Ser. No. 272,765
Int. Cl.² B05D *7/22*; B29D *23/08*
U.S. Cl. 427—232 **3 Claims**



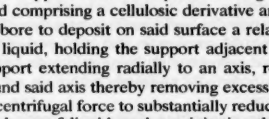
1. The method of placing a semipermeable membrane on the surface of an elongated bore formed in an elongated porous, ceramic support which comprises forcing a relatively viscous liquid comprising a cellulosic derivative and a solvent through the bore to deposit on said surface a relatively thick layer of the liquid, holding the support adjacent to one end with the support extending radially to an axis, rotating said support around said axis thereby removing excess liquid from the bore by centrifugal force to substantially reduce the thickness of said layer of liquid, and precipitating the cellulosic derivative from said solvent to produce a cellulosic semipermeable membrane on said surface.

3,904,789

MASKING METHOD FOR USE IN ALUMINIZING SELECTED PORTIONS OF METAL SUBSTRATES

Kenneth K. Speirs; William M. Hoy, and Robert Bradley, all of San Antonio, Tex., assignors to Chromalloy American Corporation, New York, N.Y.

Filed Apr. 24, 1974, Ser. No. 463,818
Int. Cl.² C23C *9/02*; B05D *1/32*
U.S. Cl. 427—253 **7 Claims**



1. A method for aluminizing a selected area of a steel part which comprises,
masking the surface of said part except for the area to be aluminized by electroplating a metal coating of a masking metal selected from the group consisting of copper, nickel and chromium of thickness at least about 1 mil to said surface,
subjecting said steel part to aluminizing by embedding said part with the masked surface in an aluminizing cementation pack and heating said part and pack to an aluminizing temperature,
removing said part from said pack,
said selectively removing the masking metal while preserving the area with the aluminized coating.

2. A method for aluminizing a selected area of a steel part which comprises,
masking the surface of said part except for the area to be aluminized by electropolating a metal coating of at least about 1 mil thick of a masking metal selected from the

group consisting of copper, nickel and chromium to said surface,

subjecting said steel part to aluminizing by embedding said part in an aluminizing cementation pack comprising particulate aluminum and containing a small but effective amount of an energizer of aluminum trichloride and heating said part and pack to an aluminizing temperature,

removing said part from said pack,

and selectively dissolving the masking metal in an aqueous acid solution of sufficient dissolution strength while preserving the area with the aluminized coating.

3. A method of aluminizing a selected area of a chromium-containing steel part which comprises,

applying a coating of a resist material to said selected area, while leaving the remaining area exposed,

electroplating a metal coating of a masking metal selected from the group consisting of copper, nickel and chromium of thickness of at least about 1 mil to said exposed area,

removing the resist coating from said steel part and cleaning said part,

subjecting said steel part to aluminizing by embedding said part in a cementation pack comprising particulate aluminum powder and containing a small but effective amount ranging up to about 5% by weight of said pack of aluminum trichloride and heating said pack to an elevated aluminizing temperature,

removing said steel part from said pack,

and selectively dissolving the masking metal in an aqueous nitric acid solution of sufficient dissolution strength while preserving the area with the aluminized coating.

3,904,790

PRIMER COATING FOR ALUMINUM FOIL SURFACE

Saverio M. Maida, Wayne, Pa. 19087

Continuation-in-part of Ser. No. 284,701, Aug. 30, 1972, abandoned, which is a continuation-in-part of Ser. No. 66,581, Aug. 24, 1970, abandoned. This application Oct. 3, 1974, Ser. No. 511,513

Int. Cl.[2] B05D *5/04, 1/38*

U.S. Cl. 427—261 **4 Claims**

1. A method of coating metal foil to enhance the receptivity of said metal foil to printing ink comprising:

applying to the metal foil about 0.25 to about 2.5 pounds on a solids basis per 3000 square feet of foil a continuous, transparent, colorless primer coating film of a solution consisting essentially of a polyamide resin prepared from dimerized fatty acids, diamines and diphenolic acid, wherein the solution of the polyamide resin contains from about 10 to about 30% by weight of the polyamide resin in an appropriate solvent;

wherein the polyamide resin has a softening point of from about 98° to 108°C., an amine value of from about 5.0 to about 8.5 milligrams of potassium hydroxide per gram, an acid value of from about 2.5 to about 3.75 milligrams of potassium hydroxide per gram and a specific gravity of about 0.99;

and drying said coating at a temperature of from about 150°F. to about 600°F.

3,904,791

ORNAMENTAL COATING METHOD AND ARTICLES

Elizabeth M. Iverson, and Kenneth G. Iverson, both of 510 Sunset House North, Marco Island, Fla. 33937

Continuation-in-part of Ser. Nos. 179,576, Sept. 10, 1971, abandoned, and Ser. No. 231,723, March 3, 1972, Pat. No. 3,816,155, each is a continuation-in-part of Ser. No. 854,761, Sept. 2, 1969, abandoned. This application Aug. 16, 1973, Ser. No. 388,999

Int. Cl.[2] B44C *1/22*

U.S. Cl. 427—277 **20 Claims**

1. A one-coat method for producing a decorative and ornamental protective simulated wood grain coating which comprises the steps of:

A. preparing a colored coating material consisting essentially of a viscous quickly settable liquid resinous thixotropic coating vehicle containing at leas one colorant, said colorant and any additional colorant which may be present being capable of entering into and being thoroughly admixed with and substantially uniformly dispersed throughout the vehicle, at least part of the colorant having physical properites whereby migration of the colorant within the vehicle may occur, said colorant being present in gradations of the same color corresponding to the colors of the wood grain to be simulated,

B. thoroughly mixing said vehicle and colorant to homogenize the same, and

C. spreading the resulting viscous liquid homogeneous mixture onto a base surface over substantially the entire surface in a directional pattern corresponding generally to the desired wood grain pattern,

D. while said base surface is maintained flat and level, gently acting upon the coating mixture while still liquid and viscous, without brushing, to level the same into a layer substantially uniform thickness and to disrupt the surface of the coating to induce migration and concentration of colorant within the coating to develop a wood grain pattern having visible color lines of demarcation in the coating, and

E. permitting said coating to set-up and harden quickly in from a few seconds to no more than 10 to 20 minutes.

3,904,792

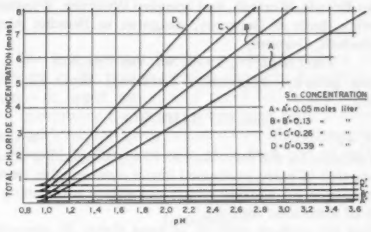
CATALYST SOLUTION FOR ELECTROLESS METAL DEPOSITION ON A SUBSTRATE

Michael Gulla, Newton, and William A. Conlan, Jr., Attleboro, both of Mass., assignors to Shipley Company, Inc., Newton, Mass.

Continuation-in-part of Ser. No. 224,742, Feb. 9, 1972, abandoned. This application June 27, 1973, Ser. No. 374,093

Int. Cl.[2] B44D *1/092*

U.S. Cl. 427—304 **59 Claims**



1. A catalyst formulation for catalyzing a substrate prior to electroless metal deposition, said formulation comprising the product of admixture of (1) catalytic precious metal ions, (2) stannous ions in an amount in molar excess of said catalytic metal ions, the ratio of said stannous ions to said precious metal ions varying between 2:1 and 100:1, (3) hydrogen ions in an amount sufficient to provide a formulation having a pH less than about 3.5 and (4) extraneous halide ions other than iodide ions, the concentration of said extraneous halide ions at a pH below the precipitation point of the catalyst being sufficient to make the total halide ion concentration at least 0.2 moles per liter in excess of the concentration of halide ions provided by all other catalyst components and at a pH at or above the precipitation point being at least sufficient to prevent the formation of a precipitate.

3,904,793

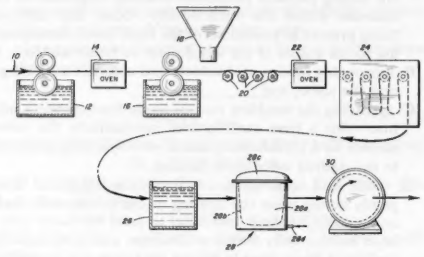
CRUSHED PILE FABRIC AND METHOD

Amos U. Priester, Jr., La Grange, Ga., assignor to Deering Milliken, Inc., Spartanburg, S.C.

Continuation of Ser. No. 803,335, Feb. 28, 1969, abandoned. This application June 24, 1971, Ser. No. 156,532

Int. Cl.[2] D06M 9/14

U.S. Cl. 427—369 11 Claims



1. A method for producing a crushed pile fabric comprising the steps of

a. wetting a length of woven, knitted or flocked pile fabric capable, when wet, of receiving a substantially permanent crush upon the application of pressure;

b. forming the wet fabric into a crumpled ball-shaped mass; and

c. applying an inwardly directed force to a major portion of the outer surface of the wet mass from a plurality of directions and in the general direction of the center of the mass to compress the same, express excess liquid therefrom and randomly and permanently crush the pile.

3,904,794

PROCESS FOR THE MANUFACTURING OF A PLANOGRAPHIC PRINTING PLATE CAPABLE OF BEING PROCESSED INTO A PLANOGRAPHIC PRINTING FORM REQUIRING NO WETTING

Wilhelm Brandt, Wertach, and Irmgard Bindrum, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Sept. 10, 1973, Ser. No. 395,550

Claims priority, application Germany, Sept. 11, 1972, 2244486

Int. Cl.[2] B44D 1/14

U.S. Cl. 427—375 6 Claims

1. A process for the manufacture of a planographic printing plate capable of being processed into a planographic printing form requiring no wetting which comprises roughening the surface of a metallic support,

coating the surface with an at least about 30 percent by weight dispersion of polytetrafluoroethylene containing a reducing activator capable of reducing a noble metal in a solution of a salt thereof, the quantity of dispersion applied being such that, after being sintered, the dispersion layer completely covers the roughened surface,

drying the dispersion layer at temperatures up to about 110°C., heating the dried dispersion layer at a temperature between about 180 and 220°C.,

treating the cooled dispersion layer with a sensitizing solution containing a noble metal salt, thus forming nuclei of the noble metal salt,

treating the dispersion layer with a nickel-plating solution containing nickel ions and a reducing agent at least until a continuous nickel layer is deposited thereon,

reinforcing the deposited nickel layer by electroplating,

deactivating the nickel layer by heating to 90° to 100°C.,

and sintering the polytetrafluoroethylene layer at a temperature between about 380° and 400°C.

3,904,795

ARTICLES AND METHOD FOR FORMING THEM USING HEATFUSIBLE COATINGS FROM AQUEOUS DISPERSIONS OF WATER-INSOLUBLE POLYMERS

Andrew Mercurio, Hatboro, Pa., assignor to Rohm & Haas Company, Philadelphia, Pa.

Filed Apr. 19, 1973, Ser. No. 352,836

Int. Cl.[2] B32B 15/08, 17/10; C03C 17/32

U.S. Cl. 427—375 17 Claims

1. A method of coating coated or uncoated substrates comprising the steps of applying a coating of a nonpolluting aqueous latex or dispersion of a fusible water-insoluble addition polymer of ethylenically unsaturated monomers to the substrate, the polymeric particles in said dispersion being of a large number average diameter, as compared to usual emulsion polymerized dispersions, of from about 0.5 micron to about 10 microns, the particles being monodisperse, having a heterogeneity index of <1.7, calculated as the ratio of the weight or volume average diameter, $\bar{d}_4$, to the number average diameter $\bar{d}_1$, where $\bar{d}_1 = \Sigma n_i d_i / \Sigma n_i$ and $\bar{d}_4 = \Sigma n_i d_i^4 / \Sigma n_i d_i^3$, the minimum film-forming temperature of the composition being between about 10° C., and about 200° C., drying said coating under conditions such that the water evaporates substantially completely at a temperature below the minimum film-forming temperature of the coating and the particles pack uniformly so that the particles do not coalesce to a continuous film and the coating dries to a loosely coherent powdery uncracked layer, and heating the dry powdery coating to a temperature at which the particles fuse to a continuous, uncracked film, the thickness of the fused coating being between 0.1 mil and 10 mils.

3,904,796

PROCESS FOR THE PRODUCTION OF POLYURETHANE COATINGS

Bruno Zorn; Klaus Noll, both of Cologne; Harald Oertel, Odenthal-Gloebusch, and Harro Traubel, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen Bayerwerk, Germany

Filed Apr. 20, 1973, Ser. No. 353,034

Claims priority, application Germany, Apr. 4, 1972, 2221756

Int. Cl.[2] B44D 1/02

U.S. Cl. 427—390 10 Claims

1. A process for the production of light stable coatings resistant to solvents, folding, and rubbing, on textile, leather, or artificial leather substrates from solutions of polyurethanes and polyisocyanates which comprises:

A. mixing:

1. a solution of

a. a substantially linear, segmented film-forming polyurethane urea elastomer containing essentially no free-NCO or NH_2 groups, said elastomer prepared from

i. a prepolymer containing-NCO groups derived from an aliphatic or cycloaliphatic diisocyanate and a polyhydroxyl component, and

ii. an amino functional divalent chain extender, and

b. a mixture of

i. an aromatic or aliphatic hydrocarbon, and

ii. a C_3—C_8 aliphatic or cycloaliphatic secondary or tertiary alcohol, the weight ratios of (i) to (ii) being in the range of 1:10 to 10:1, the solids content of said solution being between 5 and 40% by weight, with

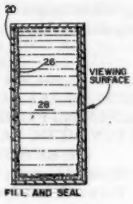
2. a non-volatile, aliphatic or cycloaliphatic polyisocyanate having an NCO-functionality of more than 2.0, said non-volatile aliphatic or cycloaliphatic polyisocyanate being used in a weight ratio of component (1) to component (2) of from 10:1 to 1:1, based on the solids content of component (1), thereby forming a polyurethane coating solution,

B. applying said polyurethane coating solution to said substrate,
C. evaporating the solvents off at elevated temperatures, and
D. allowing the resulting polyurethane coating to react to completion.

3,904,797
HOMEOTROPIC ALIGNMENT OF LIQUID CRYSTALS IN A DISPLAY CELL BY BAKED ON IONIC SURFACTANTS

Freeman B. Jones, Jr., Westlake Village, and Ronald M. Govan, Camarillo, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed May 7, 1973, Ser. No. 357,567
Int. Cl.² B44F *1/00;* **C09K** *3/34;* **G02F** *1/29*
U.S. Cl. 428—1 **6 Claims**



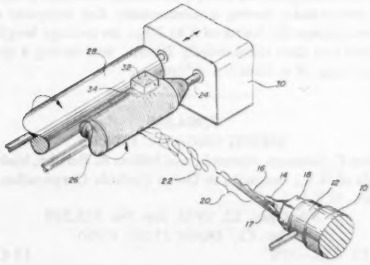
1. A liquid crystal display cell having a first ionic dopant baked onto the walls thereof and containing a liquid crystal material consisting essentially of 4-methoxybenzylidene-4′-n-butylaniline and 4-ethoxybenzylidene-4′-n-butylaniline, said liquid crystal material being doped with a second ionic dopant;

said first and second ionic dopants having the general formula $R_1R_2R_3R_4N^+B^-(R_5)_4$ where R_1, R_2, R_3, R_4 and R_5 are each selected from the group consisting of phenyl, biphenyl and $CH_3(CH_2)_n$, where n is a positive integer or zero.

3,904,798
VARYING DENSITY CARTRIDGE FILTERS

Clifford M. Vogt, Madison; John W. Soehngen, Berkeley Heights, and Joseph C. Polise, Morris Plains, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Division of Ser. No. 837,833, March 24, 1972, Pat. No. 3,801,400. This application Oct. 23, 1973, Ser. No. 408,685
Int. Cl.² D04H *1/04;* **B01D** *50/00, 39/16*
U.S. Cl. 428—36 **11 Claims**

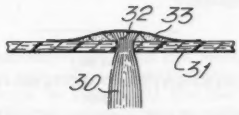


1. A self-bonded annular cylindrical non-woven fibrous structure consisting essentially of randomly arranged self-bonded substantially continuous synthetic organic polymeric melt-extruded, fiber-forming material, the density of said structure at at least two different locations in its thickness differing at some intermediate location by at least about 10% from two locations on either side thereof in its thickness.

3,904,799
TUFTED CARPET

Stanley Shorrock, "The Braids", Billinge End Rd., Blackburn, Lancashire, England

Continuation of Ser. No. 208,381, Dec. 15, 1971, Pat. No. 3,778,330. This application Aug. 20, 1973, Ser. No. 390,061
Claims priority, application United Kingdom, Dec. 31, 1970, 62093/70The portion of the term of this patent subsequent to Dec. 11, 1990, has been disclaimed.
Int. Cl.² D03D *27/00;* **D04H** *11/00*
U.S. Cl. 428—92 **10 Claims**

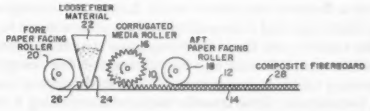


1. A carpet comprising a base fabric, a plurality of straight tufts of multi-filament pile yarn inserted in said fabric so that each tuft has a long pile end and a short fixing end, the filaments of the fixing end being splayed apart, and a coating of a water-based latex adhesive applied to the splayed ends to secure each end in position in the base fabric.

3,904,800
FILAMENT REINFORCED FIBERBOARD FOR BOXES

John P. Neubauer, 36 Boxwood Clr., Bryans Road, Md. 20616

Filed Mar. 18, 1974, Ser. No. 452,155
Int. Cl.² B32B *1/00;* **B31F** *1/20*
U.S. Cl. 428—186 **2 Claims**



1. The improvement in the process of making ordinary fiberboard of the type in which a corrugated paper is placed between an upper and a lower paper facing and adhered to both, comprising the step of dispensing from a loose mass individual loose randomly oriented long fiber filaments which are adhered to the inner side of at least one of said paper facings.

3,904,801
HYDROXYLATED AND CHLORINATED BLOCK COPOLYMER LAMINATES

James T. Harlan, Jr., Torrance, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 19, 1973, Ser. No. 417,348
Int. Cl.² B32B *27/08*
U.S. Cl. 428—246 **4 Claims**

1. A laminate comprising:
a. a first substrate comprising a block copolymer having at least one polymer block of the group consisting of polymer blocks of conjugated dienes and hydrogenated polymer blocks of conjugated dienes, and at least two polymer blocks of a monoalkenyl arene;
b. a second substrate of the group consisting of a textile, polyvinyl chloride and leather;
c. and as the bond therebetween, a composition comprising:
1. 4–25% by weight of a chlorinated and hydroxylated block copolymer; and

2. 75–96% by weight of a supplementary polymer of the group consisting of polyurethanes, polychloroprenes, polystyrenes, block copolymers having at least two monoalkenyl arene polymer blocks and at least one block of the group consisting of conjugated diene polymer blocks And hydrogenated polymer blocks of conjugated dienes. the chlorinated and hydroxylated block copolymers comprising at least two polymer blocks of at least one monoalkenyl arene and at least one chlorohydrinated polymer block of the group consisting of polymerized conjugated dienes, and hydrogenated polymer blocks of conjugated dienes, the chlorine and hydroxyl radicals being directly attached to carbon atoms of the polymeric chain, the weight ratio of chlorine atoms to hydroxyl groups being between about 0.5–5.0, the chlorine content being 1–15% by weight of the copolymer.

3,904,802
TRANSFER ELEMENTS AND METHODS OF PREPARING SAME

Albert E. Brown; Allan T. Schlotzhauer, and Douglas A. Newman, all of Glen Cove, N.Y., assignors to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,401
Int. Cl.[2] B41C *1/06;* **B41M** *5/02;* **B32B** *3/00*
U.S. Cl. 428—320 **10 Claims**

1. The process of preparing a pressure-sensitive transfer element comprising a flexible foundation carrying a uniform water-applied pressure-sensitive microporous coating containing pressure-exudable ink composition, which comprises the steps of forming a coating composition comprising a binder material containing from about 40 to 80% by weight of a water-insoluble, water-dispersible synthetic thermoplastic resin and from about 60 to 20% by weight of a water-soluble film-forming material, an oleaginous material which is incompatible with said binder material, a quantity of imaging material, and an aqueous solvent; applying said coating composition to a flexible foundation in the form of a coating of uniform thickness; and evaporating said aqueous solvent to solidify the coating and form a microporous structure containing within the pores thereof a pressure-exudable ink composition containing said oleaginous material and said imaging material.

4. A pressure-sensitive transfer element comprising a flexible foundation having thereon a thin, microporous, water-applied ink layer comprising a microporous structure of resinous binder material containing within the pores thereof a pressure-exudable ink comprising an oleaginous material which is incompatible with said binder material and imaging material, characterized by said binder material comprising from about 40 to 80% by weight of a water-insoluble, water-dispersible synthetic thermoplastic resin and from about 60 to 20% by weight of a water-soluble film-forming material.

3,904,803
TRANSFER ELEMENTS AND PROCESS

Albert E. Brown; Allan T. Schlotzhauer, and Douglas A. Newman, all of Glen Cove, N.Y., assignors to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Filed Oct. 31, 1974, Ser. No. 519,400
Int. Cl.[2] B41C *1/06;* **B41M** *5/02;* **B32B** *3/00*
U.S. Cl. 428—320 **10 Claims**

1. Pressure-sensitive reusable transfer element comprising a flexible foundation, a bonding layer on said foundation and a volatile vehicle-applied microporous resinous ink layer adhered to said bonding layer, characterized by said bonding layer comprising a mixture of from about 20 to 60 parts by weight of a water-soluble film-forming binder material and from about 80 to 40 parts by weight of a water-insoluble, water-dispersible film-forming binder material.

7. Process for producing pressure-sensitive reusable transfer elements which comprises the steps of:

a. coating a flexible foundation with a continuous uniform layer of an aqueous composition comprising from about 20 to 60 parts by weight of a water-soluble film-forming binder material and from about 80 to 40 parts by weight of a water-dispersible, water-insoluble film-forming binder material;

b. drying said layer by evaporation of the water to form a thin bonding layer on said foundation;

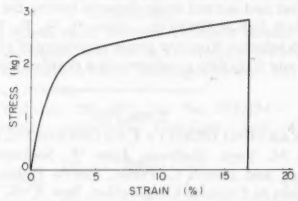
c. coating the surface of said bonding layer with a continuous uniform layer of ink coating composition comprising a film-forming binder material, an incompatible oil, coloring matter and a volatile vehicle which is at least a partial solvent for either said water-soluble binder material or said water-insoluble binder material of said bonding layer; and

d. drying said ink coating by evaporation of said volatile vehicle to form a microporous structure of said film-forming binder material solvent-bonded to said bonding layer and containing within the pores thereof said incompatible oil and coloring matter as a pressure-exudable ink.

3,904,804
POLYOLEFIN MICRO-FLAKE AGGREGATION USEFUL FOR MANUFACTURING SYNTHETIC PAPERS AND POLYOLEFIN SYNTHETIC PAPERS OBTAINABLE THEREWITH

Yoshijiro Tabara; Hiroshi Akiyama; Masayuki Igawa; Tadashi Maekawa, and Tokuo Shinomiya, all of Otake, Japan, assignors to Mitsubishi Rayon Co., Ltd., Japan

Filed Oct. 7, 1969, Ser. No. 864,457
Claims priority, application Japan, Oct. 14, 1968, 43-74209; Oct. 14, 1968, 43-74210; July 31, 1969, 44-60502; Aug. 2, 1969, 44-61322; Aug. 4, 1969, 44-61518
Int. Cl.[2] B32B *27/32, 5/16;* **D21H** *5/12*
U.S. Cl. 428—332 **3 Claims**



1. A synthetic dry micro-flake aggregate useful for manufacturing synthetic paper, which comprises numerous microflakes consisting essentially of at least one polyolefin and 0.01% to 15%, based on the weight of said polyolefin, of at least one surface active compound mixed into said polyolefin, each micro-flake having a substantially flat, irregular shape and an average thickness of 5 to 20 μ, an average length and width of less than substantially 20mm., and having a specific surface area of at least 0.1 m^2/gm.

3,904,805
SIZING ORGANIC FIBERS

Gordon C. Johnson, Armonk, and Milton A. Berube, Mahopac, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Jan. 22, 1973, Ser. No. 325,328
Int. Cl.[2] D06M *15/38, 15/66*
U.S. Cl. 428—378 **13 Claims**

1. The process which comprises treating polyester and nylon fibers with an aqueous mixture of a water dispersible salt of a copolymer of ethylene and one of acrylic or methacrylic acid which copolymer contains at least 14 weight percent, based on the weight of the copolymer, of polymer units therein derived from at least one of acrylic acid or methacrylic acid, at least 40 weight percent of the polymer units

are ethylene, and said copolymer has a melt index below 250 decigrams per minute, and a hydrolyzable organo functional silane of the formula $XR'SiY_3$ wherein X contains a functional group which is condensible with a carboxylic acid, and R′ is a saturated hydrocarbon radical containing at least three carbon atoms in sequence therein separating X from Si and bonded to both, provided that when X is HS-, R′ may contain two carbon atoms in sequence separating the HS- from Si and Y is a hydrolyzable group, there being at least about 0.25 mole of XR′ — provided by the silane for each mole of COO— present in the copolymer; whereby to adhere said copolymer to said fibers.

3,904,806

COMPOSITE FILMS OF GLASSINE-POLYOLEFIN COPOLYMER RESINS EXHIBITING HIGH OXYGEN BARRIER CHARACTERISTICS

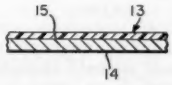
Marion Glen Waggoner, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 28, 1973, Ser. No. 336,765

Int. Cl.[2] B05C *9/04;* **D21H** *1/40*

U.S. Cl. 428—511 **4 Claims**

1. A translucent, flexible, composite film exhibiting high oxygen barrier characteristics consisting essentially of glassine paper coated on at least one side with an adhering polyolefin copolymer film consisting essentially of a uniform, random, direct copolymer of ethylene with from about 2 to about 20% by weight of an α,β-ethylenically unsaturated monocarboxylic acid of from 3 to 8 carbon atoms, uniformly ionized to from

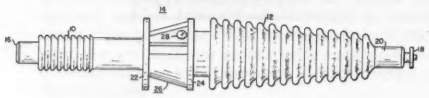


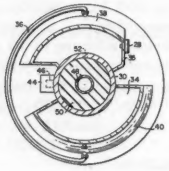
0 to 90% by association with metal ions having ionized valences of from 1 to 3, inclusive, said film of a copolymer of ethylene adhering to the glassine with fiber tear adhesion and said composite film being characterized by exhibiting an average oxygen transmission rate equal to or less than 1 $(cm^3 \cdot mil)/(100\ in.^2 \cdot 24\ hr. \cdot atm.)$.

3,904,807
ELECTRICAL BUSHING HAVING A TWO-CHAMBERED FLUID EXPANSION SYSTEM

Jerry L. Hildenbrand, Portland, Oreg., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 22, 1974, Ser. No. 516,934
Int. Cl.[2] H01B 17/26
U.S. Cl. 174—12 BH 12 Claims





10. An electrical bushing having interior and exterior ends and containing a fluid dielectric, said bushing comprising:

a conducting lead;

means for insulating the conducting lead;

means for mounting the bushing to an electrical apparatus casing; and

first and second chambers located adjacent to the mounting means, said chambers being connected in flow communication relationship with each other and with the fluid in the bushing;

said first and second chambers being connected in flow communication relationship with each other through a first opening in the first chamber and a second opening in the second chamber, said first opening being located substantially at the radially outermost portion of the first chamber, and said second opening being located substantially at the radially outermost portion of the second chamber, with said first and second openings being located at substantially radially opposite positions in the bushing.

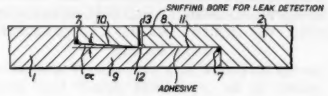
3,904,808
PRESSURIZED GAS INSULATED HIGH VOLTAGE LINES WITH ADHESIVELY CONNECTED OUTER PIPE

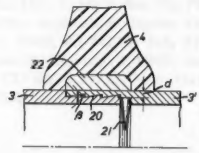
Karl Kriechbaum, Kassel, Germany, assignor to Licentia Patent-Verwaltungs-G.m.b.H., Frankfurt am Main, Germany

Filed July 20, 1973, Ser. No. 381,250
Claims priority, application Germany, July 20, 1972, 2235528; Aug. 17, 1972, 2240369; Aug. 31, 1972, 2242946; Nov. 11, 1972, 2255285
Int. Cl.[2] H01B 9/06; H02G 15/24; H01R 7/32
U.S. Cl. 174—21 C 8 Claims

1. In a pressurized gas insulated high voltage line formed from a plurality of metal pipes each having a tubular inner conductor axially mounted therein by means of insulative supports, with the ends of each of said pipes and its associated inner conductor being conductively connected with the ends of the adjacent pipes and conductors respectively and a pressurized gas within said connected pipes and surrounding said connected conductors, the improvement wherein: said pipes have the same outer diameter with said ends of each of said pipes being provided with portions which mate with the end portions of the adjacent pipes in an overlapping relationship; each said pipe is gas tightly and mechanically firmly connected at its ends to the adjacent pipes by an adhesive; at least a part of said overlapping end portions is free of said adhesive and provides an electrically conductive connection between adjacent said pipes; each said inner tubular conductor is provided at its ends with a plurality of successive conical sections, said conical sections having an angle of inclination of less than fifteen degrees; each of the ends of each said inner tubular conductor engages and forms a bayonet catch with a respective end of the adjacent inner tubular conductor; and spring means which engage the associated ends of adjacent inner conductors are provided for maintaining the bayonet catch under spring pressure.

8. In a pressurized gas insulated high voltage line formed from a plurality of metal pipes each having a hollow inner conductor axially mounted therein by means of insulative supports, with the ends of each of said pipes and its associated inner conductor being conductively connected with the ends of the adjacent pipes and conductors respectively and a pressurized gas within said connected pipes and surrounding said connected conductors, the improvement wherein: said pipes have the same outer diameter with said ends of each of said





pipes being provided with portions which mate with the end portions of the adjacent pipes in an overlapping relationship; said overlapping end portions of adjacent pipes are of equal length whereby the end surface of each of said pipes abuts a portion of the other said adjacent pipes; a sealing ring is disposed at each of the points of abutment of the end surfaces of adjacent said pipes; said overlapping end portion of each of said pipes is divided into a conical portion and a cylindrical portion; each said pipe is gas tightly and mechanically firmly connected at its ends to the adjacent pipes by an adhesive provided only between the cylindrical portions of the overlapping said end portions; the remainder of said overlapping end portions is free of said adhesive and provides an electrically conductive connection between adjacent said pipes; and the surface of each said cylindrical portion of at least the one of said end portions which is overlapped by the end portion of the adjacent pipe is provided with an annular groove, and the cylindrical portion of each of the overlapping end portions is provided with an outwardly directed bore which is in communication with said groove.

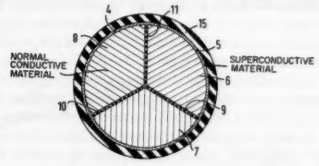
3,904,809
TUBULAR ELECTRICAL CONDUCTOR MADE UP OF INDIVIDUAL SUPERCONDUCTING CONDUCTORS

Peter Penczynski, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 21, 1974, Ser. No. 444,501
Claims priority, application Germany, Mar. 1, 1973, 2310327
Int. Cl.[2] H01L 39/02
U.S. Cl. 174—27 2 Claims

1. In a tubular electrical conductor for the conduction of one phase of a three phase cable, said conductor having at

least one layer of individual conductors each of which comprise a carrier fabricated of electrically normally conductive metallic material having a layer of electrically superconductive metallic material applied thereto and which are disposed adjacent each other in a side-by-side arrangement, the improvement comprising a carrier structure for each of said individual conductors, said carrier structure being subdivided into at least two parts along the longitudinal axis thereof, and said at least two parts being twisted about said longitudinal axis, and means, disposed between said at least two parts, for electrically insulating said at least two parts from each other.



3,904,810

HOUSING FOR SHIELDING ELECTRICAL DEVICES FROM HIGH FREQUENCY ELECTROMAGNETIC RADIATION INTERFERENCE

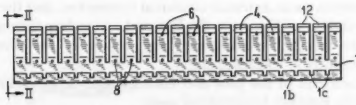
Maximilian Kraus, Ebersberg, Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Sept. 14, 1973, Ser. No. 397,404

Claims priority, application Germany, Sept. 25, 1972, 2247005

Int. Cl.[2] H05K 9/00

U.S. Cl. 174—35 MS **13 Claims**



1. In an electrically conductive housing for shielding electrical devices against interference from high frequency electrical radiation and having an access opening with a frame area thereabout and an openable electrically conductive door having a marginal frame area thereon opposing the housing frame area entirely around said opening in the closed position of the door:

electrically conductive contact spring strip means extending entirely around said opening;

means connecting said spring strip means along one edge portion thereof in electrical contact to one of said frame areas entirely around said opening;

said spring strip means having resiliently flexible contact fingers integral therewith along the opposite edge of the spring strip means and normally biased toward an interengagement with the other of said frame areas in the closed position of the door;

each of said fingers having a terminal flange on its distal end portion;

means integrally entirely around said one frame area defining a clearance in which said terminal flanges are received for a substantial range of clearance movement as deflected from a maximum biased relation of the fingers to a resiliently deflected relation as pressed toward said one frame area by said other frame area in the closed position of the door, and including a retaining flange entirely along said recess engageable by said terminal flanges to retain them in the recess in the open position of the door;

said connecting means comprising an electrically conductive strip secured in electrically conductive relation to said one frame area and having a turned socket flange therealong having a plurality of interlock lugs; and

said spring strip means having along said one edge a complementary turned anchoring formation engaged within said socket and retained against displacement from the socket by said lugs.

3,904,811

OVERHEAD TRANSMISSION LINES WITH DAMPER MEANS FOR PREVENTING GALLOPING OSCILLATIONS

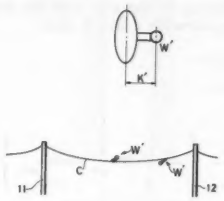
Akira Otsuki, Matsudo; Kimikazu Numata, and Kazumitsu Kawai, both of Narita, all of Japan, assignors to The Fujikura Cable Works, Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 275,036, July 25, 1972, abandoned. This application Nov. 21, 1973, Ser. No. 417,916

Claims priority, application Japan, July 28, 1971, 46-56667; July 30, 1971, 46-57351

Int. Cl.[2] H02G 7/14, 7/12

U.S. Cl. 174—42 **7 Claims**



1. In combination with an overhead transmission line, a vibration damper for preventing galloping of the line, comprising one or more eccentric weights rigidly secured to the line with its center of gravity spaced from the vertical plane including the axis of the line, in which W' (the weight of the eccentric weight) and K' (the amount of its eccentricity) are given by solving the following equations of the amplitude of the oscillation of the line with the weights secured thereto when experiencing a lateral wind:

$$A = \sqrt{-\frac{4F_1}{3E_2}}$$

$$E_1 = \frac{\pi\rho dV^2}{2}\left\{\frac{C_{11}-C_{12}}{V}\omega + \frac{C_{m1}}{V}\omega ke\right\}$$

$$E_2 = \frac{\pi\rho dV^2}{2}\left\{\frac{C_{11}-3C_{21}-6C_{22}}{8Vh^3}\omega^3 - \frac{C_{12}}{4V}\omega ke^2 + \frac{C_{m1}}{2V^3}\omega^2 ke\right\}$$

$$ke = \frac{\omega^2 K' W'}{g\left\{\left(\frac{n\pi}{l}\right)^2 GI_p - \left(J + \frac{K'W'}{g}\right)\omega^2\right\}}$$

$$\omega = \frac{n}{2l}\sqrt{\frac{gT}{W}}$$

for the values of W' and K' under the additional conditions that the amplitude of the oscillations of the line with the eccentric weights is half or less of the amplitude of the oscillation of the line without the eccentric weights when $n = 2$ where

A is the amplitude (m) of oscillation of the transmission line,

ϕ is expected air density (Kg.sec^2/m^4)
d is the outer diameter (m) of the line,
V is the expected velocity (m/sec) of the lateral wind which maximizes the product of K′ and W′,
C_{L1} is the coefficient of the lift force caused by the wind,
C_{D0} and C_{D2} are the coefficients of the drag force caused by the wind,
C_{m1} is the coefficient of rotational moment; l is the span length (m) of the line,
n is 2,
GI_p is the torsional rigidity (kg.m^2.rad) of the line,
J is the moment of inertia of the line per unit length (Kg.sec^2),
g is the acceleration (m/sec^2) of the gravity,
T is the tensile force (kg) of the line, and
W is the weight of the line per unit length (kg/m).

7. A method for preventing galloping of an overhead transmission line, comprising the steps of providing one or more weights W′ adapted to be rigidly secured to the line with its center of gravity spaced from the vertical plane including the axis of the line by a distance K′, determining the magnitude of W′ and K′ by solving the following equations for the amplitude of the galloping of the line with the weights secured thereto when experiencing a lateral wind:

$$A=\sqrt{-\frac{4F_1}{3F_2}}$$

$$E_1=\frac{\pi\rho dV^2}{2}\left\{\frac{C_{L1}-C_{D0}}{V}\omega+\frac{C_{m1}}{V}\omega ke\right\}$$

$$E_2=\frac{\pi\rho dV^2}{2}\left\{\frac{C_{L1}-3C_{D0}-6C_{D2}}{8V^3}\omega^3-\frac{C_{D2}}{4V}\omega ke^2+\frac{C_{m1}}{2V^3}\omega^3 ke\right\}$$

$$ke=\frac{\omega^2K'W'}{g\left\{\left(\frac{n\pi}{l}\right)^2 GI_p-\left(J+\frac{K'W'}{g}\right)\omega^2\right\}}$$

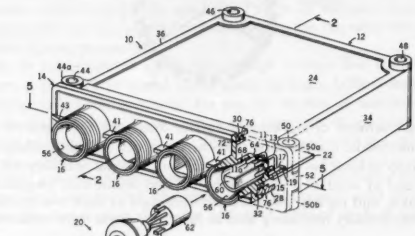
$$\omega=\frac{n}{2l}\sqrt{\frac{gT}{W}}$$

for the values of W′ and K′ under the additional conditions that the amplitude of the galloping of the line with the eccentric weights is half or less of the amplitude of the oscillation of the line without the eccentric weights when $n=2$ where

A is an amplitude (m) of oscillation of the transmission line;
ϕ is expected air density (Kg-sec^2/m^4)
d is the outer diameter (m) of the line;
V is the expected velocity (m/sec) of the lateral wind which maximizes the product of K′ and W′;
C_{L1} is the coefficient of the lift force caused by the wind;
C_{D0} and D_{D2} are the coefficients of the drag force caused by the wind;
C_{m1} is the coefficient of rotational moment,
l is the span length (m) of the line,
n is 2;
GI_p is the torsional rigidity (kg.m^2.rad) of the line,
J is the moment of inertia of the line per unit length (Kg.sec^2)
g is the acceleration (m/sec^2) of the gravity,
T is the tensile force (kg) of the line, and
W is the weight of the line per unit length (kg/m),

and then rigidly securing said weights W′ to the line so that the centers of gravity of said weights W′ are spaced a distance K′ from the axis of the line.

3,904,812
LOGIC MODULE
Vernon M. Daffron, Ellisville, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.
Filed Aug. 10, 1973, Ser. No. 387,260
Int. Cl. H05k *5/00*
U.S. Cl. 174—52 S **8 Claims**



1. A logic module assembly comprising:
a container for containing electronic circuitry;
a removable connector base closing the container;
at least one connector receptacle formed on the base and protruding outside the closed container;
connector pins mounted in each receptacle, the pins having one end thereof protruding into the receptacle for connection to an external electrical connector, and the other end thereof, opposite the one end, extending through the base and protruding into the container for electrical connection to the circuitry;
the one end of the pins and each receptacle have substantially parallel longitudinal axes;
connector assembly means for electrical connection with each receptacle;
first means included on each connector assembly for radially aligning the connector assembly with its respective receptacle;
sealing means included on the connector assembly for sealingly engaging each connector assembly in its respective receptacle; and
second means included on each connector assembly for permitting the sealing means to urge the connector assembly into proper axial seating with its respective receptacle.

3,904,813
ADHESIVE FOR METAL-CLAD SHEETING
Gaylord L. Groff, North St. Paul, Minn., assignor to Mh nesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Mar. 18, 1974, Ser. No. 451,921
Int. Cl.[2] **B32B** *27/38;* **H05K** *1/00*
U.S. Cl. 174—68.5 **15 Claims**

10. Multilayered sheeting that is windable in a roll and is useful as a component of electric circuitry comprising an electrically insulating polymeric base sheet that comprises a polyimide, and coated on at least one side of said base sheet, a dry nontacky flexible film of adhesive that is reactive to a flexible cured state comrpsing, in compatible mixture, comprising,

A. 100 parts by weight of a low-molecular-weight substantially completely reacted adduct of
1. a carboxyl-terminated polymer having the formula:

$$HOOC-\underset{R_2}{R}-\left[X-R_1-\underset{R_3}{X}-\underset{R_4}{R}\right]_n-COOH$$

in which X is an ester group, R and R_1 are selected from hydrocarbon groups, hydrocarbon groups having ether linkages, and combinations of them; R_2 is selected from hydrocarbon groups, carboxyl, hydrogen, and halogen, and combinations of them; R_3 is selected from hydrocarbon groups, hydrogen, halogen, and X—R—COOH groups (where X and R have the above-assigned designations), and combinations of them; and R_4 is selected from hydrocarbon groups, hydrogen, and halogen, and combinations of them; and *n* is at least one; and 2. an epoxy compound containing on the average at least about 1.3 oxirane groups per molecule, said epoxy compound being present in the amount of at least two epoxide equivalent weights for each carboxyl equivalent weight of carboxyl-terminated polymer present;

B. between about 25 and 150 parts by weight of a high-molecular-weight polyhydroxy ether formed from bisphenol A and epichlorohydrin; and

C. sufficient of an at least trifunctional aromatic anhydride curing agent to crosslink the mixture to an essentially insoluble and infusible state.

3,904,814

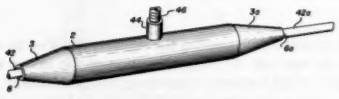
FLUID-PRESSURE OPERATED SPLICE FOR ELECTRICALLY CONDUCTIVE GABLES

Robert H. Dawson, Lake Bluff, and James L. McGrath, Medina, both of Ill., assignors to Reliable Electric Company, Franklin Park, Ill.

Filed Mar. 15, 1974, Ser. No. 451,492

Int. Cl.² H02G *15/08*

U.S. Cl. 174—84 R **3 Claims**



1. A fluid-pressure operated splice for an electrically conductive cable comprising a casing having a bore with a conical bore portion terminating at its smaller diameter end in a cable-receiving opening of the casing, a plurality of jaws in said conical bore portion, each jaw being axially tapered in the direction of said cable-receiving opening and said jaws circumferentially disposed to provide a generally tubular jaw-cluster, said jaws having recesses that cooperate to provide a jaw-cluster bore substantially coaxial with said casing bore and with said recesses having teeth exposed at said jaw-cluster bore, said casing bore having a cylindrical bore portion adjacent to the larger diameter end of said conical bore portion, a piston slidable in said cylindrical bore portion, means joining said jaws and said piston, said piston having a central cavity communicating with said jaw-cluster bore for receiving a cable inserted through said cable-receiving opening and through said jaw-cluster bore, spring means in said casing imposing a pre-load on said jaws in the direction of said cable-receiving opening to engage the cable, which pre-load is insufficient for effective gripping of the cable by a permanent set therein, and said casing having an opening for receiving fluid under pressure in said cylindrical bore portion, said bore portion being constructed to hold fluid under pressure so as to impose fluid pressure on said piston in the direction of said cable-receiving opening sufficient so that the pressure on the piston urges the teeth of the jaw-cluster into biting engagement with the cable to form form a permanent set thereon, the area of the piston acted upon by said fluid pressure and the tapers of said casing and jaws being such that the jaws remain in permanent gripping engagement with the cable upon release of said fluid pressure.

3,904,815

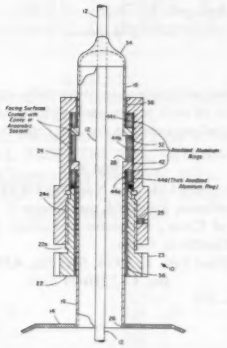
ELECTRICALLY INSULATING FEED-THROUGH FOR CRYOGENIC APPLICATIONS

Joseph A. Bamberger, Patchogue, and Donald P. Brown, Bellport, both of N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Sept. 17, 1974, Ser. No. 506,818

Int. Cl.² H01B *17/26;* **H01L** *39/02*

U.S. Cl. 174—151 **9 Claims**



1. An electrical connector for use with a dewars, comprising

a. first metallic tubular means open at one end for communicating with a dewars:

b. second metallic tubular means aligned with and spaced from said first tubular means closed at the end away from said first tubular means;

c. means consisting of stacked anodized aluminum washers, adjacent washers being in contact with each other, filling the space between said first and second tubular means;

d. means compressing said washers forming a sealed chamber within said tubular means for communicating with the interior of a dewars, said anodized aluminum washers electrically isolating said tubular means from each other; and

e. means extending through and in contact with the closed end of said second tubular means, for providing communication with the interior of said connector and a dewars.

3,904,816

METHOD FOR THE DOT-BY-DOT AND LINE-BY-LINE REPRODUCTION OF PICTURE ORIGINALS

Heinz Taudt, and Hans Keller, both of Kiel, Germany, assignors to Dr. Ing. Rudolf Hell, Germany

Filed July 19, 1972, Ser. No. 273,149

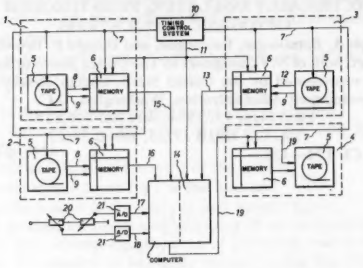
Claims priority, application Germany, July 28, 1971, 2137676

Int. Cl. H04n *1/00*

U.S. Cl. 178—6 **40 Claims**

1. A method for the dot-by-dot and line-by-line reproduction of picture originals, comprising the steps of converting a plurality of series of local picture dot successions, respectively derived from optico-electrical scanning of a plurality of picture originals, into respective series of quantized and digitized chronological picture signal successions, coordinating, dot-by-dot and line-by-line, the successions of one series, in time synchronization, with the successions of another series, and

producing, dot-by-dot and line-by-line, from said time synchronized, coordinated series of successions, a series of changed picture signal successions, with the selection of the

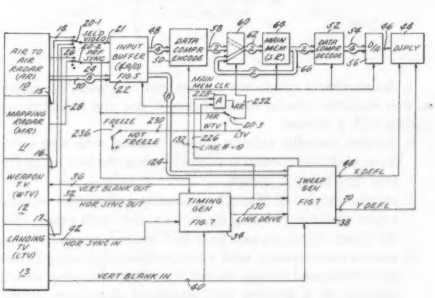


successions thereof being at least partially dependent upon the content of one of such series, and utilizing said changed series of picture signal successions for the reproduction.

3,904,817
SERIAL SCAN CONVERTER

Harvey F. Hoffman, Fairfield, and Glenn C. Waehner, Riverside, both of Conn., assignors to United Aircraft Corporation, East Hartford, Conn.

Filed Feb. 1, 1974, Ser. No. 438,888
Int. Cl.[2] H04N *5/02*
U.S. Cl. 178—6.8 **8 Claims**



1. A scan converter display system adapted for utilization with a plurality of video sources, comprising:

means settable for designating a selected one of a plurality of video sources;

timing generator means for providing display and source control timing signals, said timing generator means including a portion of said video source selecting means for providing different timing signals in response to the selection of different sources;

serial, digital memory means responsive to said timing generator means for storing signals;

input means including a portion of said video source selecting means and responsive to said timing generator means for providing to said serial memory signals relating to the video input of a selected one of the video sources;

a signal CRT display means having beam deflection and video intensity control means;

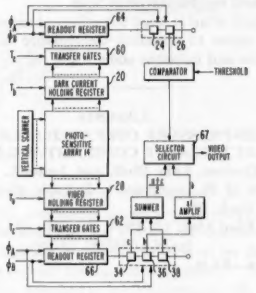
sweep generating means responsive to said timing generator means for providing at least a pair of sweep defining beam deflection signals to said display means, said sweep generating means including a plurality of different sweep generation circuits for each beam deflection control input signal required by said display means; said sweep generating means including a portion of said video source selection means for providing different sweeps to said display means in dependence upon the nature of the selected one of the video sources;

and means responsive to said timing generator means for providing video signals to said display means in response to signals from said memory means.

3,904,818
REMOVAL OF DARK CURRENT SPIKES FROM IMAGE SENSOR OUTPUT SIGNALS

Michael George Kovac, Sudbury, Mass., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 28, 1974, Ser. No. 446,893
Int. Cl.[2] H04N *5/30, 5/21*
U.S. Cl. 178—7.1 **11 Claims**



1. A circuit for processing the signals produced by an image sensor in response to photoexcitation of the image receiving locations of said sensor comprising, in combination:

means for producing for each location of the image sensor, a control signal indicative of the amplitude of the dark current at that location; and

means responsive to the control signal indicative of dark current at a location and the signals, hereinafter termed "information" signals, produced at adjacent locations when exposed to photo-excitation, for substituting for the information signal produced at a location having a dark current component which exceeds a given threshold level a second signal of an amplitude related to that of the information signals present in said adjacent locations.

3,904,819
HIGH VOLTAGE SUPPLY CIRCUITS

Geoffrey Sword; John Leslie Lawrence; Stephen Richard Raggett, all of Fareham, and Bernard Blakemore, London, all of England, assignors to Colourvision Associates, London, England

Filed Feb. 8, 1974, Ser. No. 440,703
Claims priority, application United Kingdom, Feb. 9, 1973, 6429/73; Feb. 9, 1973, 6439/73
Int. Cl.[2] H04N *5/44*
U.S. Cl. 178—7.5 R **7 Claims**

1. High voltage supply circuitry comprising;

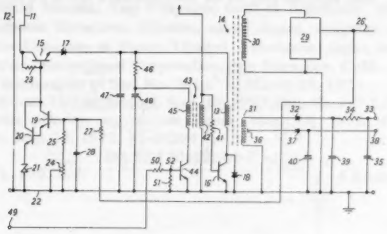
transformer means;

primary winding means in said transformer means;

controllable impedance means coupled to said primary winding means, and having control terminal means;

bipolar junction transistor switching means coupled to said primary winding means;

high voltage output circuit means coupled to said transformer; and



negative feedback means coupled to said control terminal means.

3,904,820

CATHODE-RAY TUBE WITH IMPLOSION SAFETY

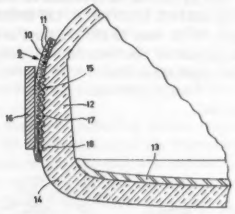
Hendrik Bongenaar, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 9, 1974, Ser. No. 431,669

Claims priority, application Netherlands, Feb. 12, 1973, 7301933

Int. Cl.[2] H01J *29/02*

U.S. Cl. 178—7.82 **3 Claims**



1. A cathode ray tube for picture display having implosion safety means, comprising a fabric reinforced adhesive tape provided around the widest part of the tube, a clamping band arranged on the upper surface of said tape, at least one of surfaces adjoining the tape on either side thereof being produced to an average roughness value of 50 μm to 500 μm and the reinforcement fabric of said tape being in contact with the projecting areas of said roughened surface, whereby the recessed areas of said roughened surface being filled up by adhesive forced out of the tape during its clamping by the band.

3,904,821

POSITION DETERMINATION DEVICES

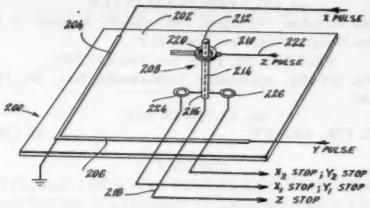
Albert L. Whetstone, Southport, Conn., and Alfred E. Brenner, Glenellyn, Ill., assignors to Summagraphics Corporation, Fairfield, Conn.

Filed Dec. 5, 1973, Ser. No. 422,049

Int. Cl.[2] G08C *21/00*

U.S. Cl. 178—19 **14 Claims**

1. A position determination device comprising a data surface, non-directional magnetostrictive media positioned proximate said data surface, first conductor means located at an edge of said transmission media for magnetostrictively inducing a simultaneous unitary longitudinal strain wave across said edge in a propagating direction perpendicular to said edge, second means positioned proximate said data surface and responsive to said propagating wave for providing an electrical



signal, and third means for digitizing the time delay from propagation to provision of said electrical signal.

3,904,822

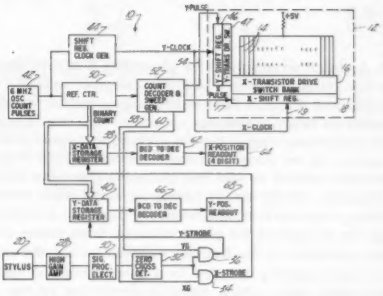
ABSOLUTE POSITION DETERMINING SYSTEM USING FREE STYLUS

Vernon C. Kamm, Farmington Hills; John T. Ioannou, Livonia, and James L. Faxon, Oak Park, all of Mich., assignors to The Bendix Corporation, Southfield, Mich.

Filed Mar. 21, 1974, Ser. No. 453,659

Int. Cl. G08c *21/00*

U.S. Cl. 178—19 **14 Claims**



1. Apparatus for producing data defining the position of a stylus on a two-dimensional reference surface comprising: means defining a reference surface for receiving a work sheet, a plurality of spaced parallel conductors substantially coextensive with said surface, switch means electrically connected to said conductors and responsive to first signals for individually applying pulses of electrical energy to said conductors in sequence to produce a pulse wave which transulates uniformly across said surface along an axis perpendicular to said conductors, clock means for producing count pulses at a predetermined frequency and sweep signals at a frequency which is a fraction of said predetermined frequency, register means connected to receive said count pulses and for storing a representation of the number of pulses occurring subsequent to initiation of each sweep signal; a stylus having position-determinant end freely positionable on said surface, pickup means including a portion carried in said stylus and inductively responsive to the pulses in said conductors for producing an output voltage, said output voltage being the analog envelope of the real time pulse voltage train generated in said portion by said pulses and being representative of the time of passage of said pulse wave at the position of the end of the stylus on the surface, and means connecting the output voltage from the stylus to the register means for reading the pulse count at the time said analog envelope passes through a preselected reference amplitude.

3,904,823

CIRCUIT ARRANGEMENT FOR GENERATING A CONTROL SIGNAL FOR THE FIELD OUTPUT STAGE IN A TELEVISION RECEIVER

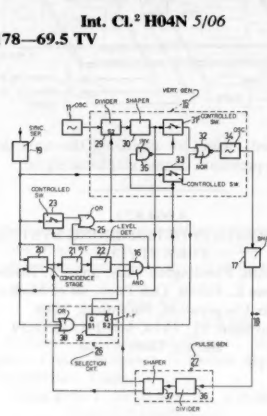
Jan Van Straaten, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 20, 1973, Ser. No. 417,549

Claims priority, application Netherlands, Nov. 24, 1972, 7215930

Int. Cl.[2] H04N *5/06*

U.S. Cl. 178—69.5 TV 10 Claims



1. A circuit arrangement for generating a control signal for the field output stage in a television receiver suitable for the reception of line and field synchronizing pulses, in which a plurality of fields constitutes an image, said circuit arrangement comprising a generator for generating a signal of the line frequency or an integer multiple thereof, a field frequency generator coupled to said line frequency generator including a frequency divider circuit having an initial state, means for applying received field synchronizing pulses to a comparison stage for comparing the phase between these pulses and the pulses generated by the frequency divider circuit, the comparison stage applying a signal to a gate associated with said comparison stage, which signal is dependent on the phase difference between the compared pulses, the field generator having direct and indirect synchronization states, a gating pulse generator generating gating pulses, namely a first gating pulse during the occurrence of which the frequency divider circuit is reset to said initial state in the off-phase state of the compared pulses and a second gating pulse which is applied to an automatic selection circuit coupled to said field frequency generator, which selection circuit switches the field generator to the indirect synchronization state when a received field synchronizing pulse and a pulse generated by the frequency divider circuit at least partly occur simultaneously, and switches the field generator to the direct synchronization state when said pulses do not coincide during the occurrence of the second gating pulse.

3,904,824

AUTOMATIC GAIN CONTROL FOR ENCODED DATA

Edward S. Caragliano, and Howard H. Nick, both of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 26, 1973, Ser. No. 428,467

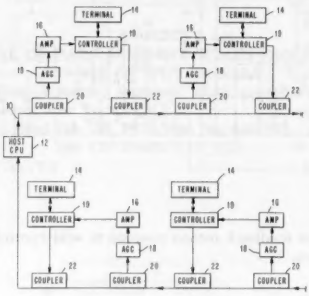
Int. Cl.[2] G01R *27/28;* H03G *3/20;* H04L *25/52*

U.S. Cl. 178—70 R 8 Claims

1. In a transmission system which includes an automatic gain control system for an amplifier and wherein the data is transmitted in a non-DC derivable form in frames including one or more flag bits;

means for selecting one of said flag bits;

means for circulating said selected flag bit a predetermined number of times to provide a repetitive pulse output from said selected flag bit for the respective frame of data; and



means for filtering said repetitive pulse output to obtain a substantially DC level indicative of the signal energy of the frame of data for application to the amplifier to accordingly adjust the gain thereof.

3,904,825

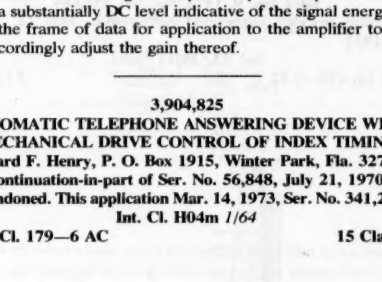
AUTOMATIC TELEPHONE ANSWERING DEVICE WITH MECHANICAL DRIVE CONTROL OF INDEX TIMING

Edward F. Henry, P. O. Box 1915, Winter Park, Fla. 32789

Continuation-in-part of Ser. No. 56,848, July 21, 1970, abandoned. This application Mar. 14, 1973, Ser. No. 341,242

Int. Cl. H04m *1/64*

U.S. Cl. 179—6 AC 15 Claims



1. In a telephone answering device of the type adapted for use with a telephone instrument having a receiver and a handset, the combination comprising:

a rotatable indexing cam;

a rotatable sprocket;

means mechanically coupling said indexing cam with said sprocket without slippage therebetween;

an endless belt of a recording medium, said belt including a plurality of spaced sprocket holes therein engaged by said sprocket;

means including a playback head for playing back information recorded on said belt into said handset;

means including said sprocket and rotatable with said cam for driving said recording belt past said playback head; and wherein

the length of said belt corresponds to a predetermined indexing portion of the periphery of said indexing cam, such that rotation of said predetermined indexing portion of said indexing cam causes a complete cycle of said belt past said playback head.

3,904,826

REMOTE CONTROL SYSTEM AND APPARATUS FOR AUTOMATIC TELEPHONE ANSWERING AND RECORDING APPARATUS

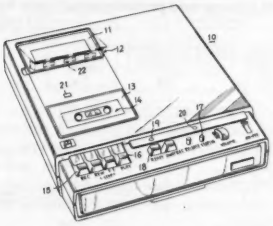
Masamichi Murata; Yuji Urayama, both of Yokohama, and Takamasa Furusawa, Shimizu, all of Japan, assignors to Victor Company of Japan, Limited, Yokohama, Japan and Dictran International Corporation, San Francisco, Calif.

Continuation of Ser. No. 341,674, March 15, 1973, abandoned. This application Sept. 14, 1973, Ser. No. 397,538

Claims priority, application Japan, Mar. 18, 1972, 47-27586; June 12, 1972, 47-68204

Int. Cl.[2] H04M *1/64*

U.S. Cl. 179—6 E 5 Claims



1. A remote control system for an automatic telephone answering and recording appartus which includes first means for recording on and reproducing from a first cassette tape an answering statement, and second means for recording on and reproducing from a second cassette tape incoming messages by callers; said system comprising:

a. answering means responsive to an incoming call arriving through a telephone line from a caller for automatically operating said first means to reproduce the answering statement previously recorded on said first cassette tape and for sending the statement through the telephone line toward the caller;

b. incoming message recording means responsive to completion of the reproduction of the answering statement by said first means for operating said second means to record on the second cassette tape incoming messages sent by the caller through the telephone line;

c. generating means for generating a plurality of kinds of pair tones comprising low tones and high tones;

d. detecting means responsive to a set a pair tones selected from the kinds of pair tones which are generated in sequence by said generating means and sent through the telephone line for producing a first control voltage only when the set of pair tone coincide with a predetermined set of pair tones;

e. first control means responsive to the first control voltage for driving said second means to rewind the second cassette tape;

f. second control means responsive to stopping of the rewinding of the second cassette tape for driving said second means to reproduce the incoming messages;

said detecting means, after producing the first control voltage, produces a second control voltage in response to first digital component pair tones of the set of pair tones which first digital component pair tones are generated by said generating means and sent through the telephone line, a third control voltage in response to second digital component pair tones of the set of pair tones which second digital component pair tones are generated by said generating means and sent through the telephone line, and a fourth control voltage in response to third digital component pair tones of the set of pair tones which third digital component pair tones are generated by said generating means and sent through the telephone line; and which further comprises means responsive to the second control voltage for converting said second means to a recording mode, means reesponsive to the third control voltage for converting said second means to a play-back mode, and means responsive to the fourth control voltage for converting said second means to a rewinding mode.

3,904,827

SYSTEM FOR LOCATING FAULTY LINE REPEATERS OF REPEATER STATIONS IN A TRANSMISSION LINE

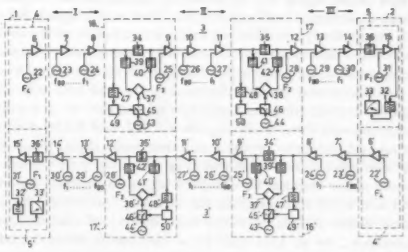
Huibert Blok, Hilversum, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 15, 1973, Ser. No. 388,387

Claims priority, application Netherlands, Aug. 24, 1972, 7211531

Int. Cl. H04b *3/46*

U.S. Cl. 179—175.31 R 5 Claims



1. System for locating faulty line repeaters of repeater stations in a transmission line of a telecommunication system, comprising continuously operating oscillators for generating a test tone each, each oscillator being coupled to the input of a line repeater, and a receiving and monitoring device connected to the transmission line for continuously indicating received test tones, characterized in that the oscillators coupled to the inputs of successive line repeaters are arranged in groups of test sections; each of the oscillators within a group generating test tones having unequal frequencies with respect to the other oscillators in said group; each of the oscillators of successive groups generating test tones having equal frequencies with respect to preceding groups; successive groups being separated from each other by an intermediate repeater station provided with a separation filter having a given pass band, test tones generated by the group directly preceding such an intermediate repeater station being transmitted to said station through the transmission line in a frequency band located beyond the pass band of the separation filter, the oscillators in said intermediate repeater stations generating test tones having mutually unequal frequencies, located within the pass band of the separation filters; and being continuously transmitted to said receiving and monitoring device; said intermediate repeater stations each including a modulator for transporting the test tones applied to said repeater stations to a frequency band located within the pass band of the separation filters for transmitting these test tones to the receiving and monitoring device.

3,904,828
COMPATIBLE SYSTEM FOR TRANSMITTING AND RECEIVING QUADRAPHONIC SIGNALS

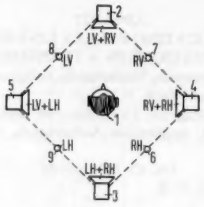
Dietmar Mallon, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 23, 1973, Ser. No. 344,182

Claims priority, application Germany, Apr. 25, 1972, 2220280

Int. Cl.² H04H *5/00*

U.S. Cl. 179—15 BT **5 Claims**



1. A method of transmitting and receiving quadraphonic signals comprising the steps of modulating a carrier signal with a first audio signal K1, modulating two subcarrier signals in phase quadrature with second and third audio signals K2 and K3, respectively, modulating said carrier signal with said two modulated subcarrier signals and suppressing said two subcarriers, modulating said carrier signal with a pilot signal having a predetermined phase relationship to said two subcarrier signals, transmitting said modulated carrier to a receiver, detecting said three audio signals K1, K2, and K3 by demodulating said carrier to produce said first audio signal K1, detecting said pilot signal, demodulating said carrier in a predetermined phase relation to said pilot signal to produce said second and third audio signals K2 and K3, and combining said three audio signals to form four individual output signals corresponding to four individual combinations of said four input signals by summing said first audio signal with said second audio signal to produce a first output signal, subtracting said second audio signal from said first audio signal to produce a second output signal, subtracting a third audio signal from said first audio signal to produce a third output signal, and providing said third audio signal alone as said fourth output signal, producing said first audio signal K1 by summing signals produced by four independent signal sources, producing said second audio signal K2 by summing signals produced by a first pair of said sources and diminishing the sum thus produced by the sum of signals produced by the other pair of sources, and producing said third audio signal K3 by summing the signal produced by one of said first pair of sources with the signal produced by one of said other pair of sources.

3,904,829
DEMAND DRIVEN MULTIPLEXING SYSTEM

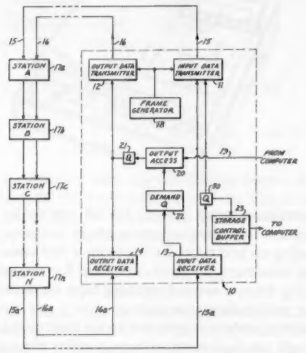
Robert F. Martin, Orange; Robert D. MacDonald, Anaheim, and C. Alan Williams, Corona Del Mar, all of Calif., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Sept. 16, 1974, Ser. No. 506,673

Int. Cl.² H04J *3/08*

U.S. Cl. 179—15 AL **5 Claims**

1. A demand driven multiplexing system comprising, in combination: a first closed-loop communication link serially connecting a central station to a plurality of remote substations; said central station including first central transmitting means for transmitting a signal train onto said first link, said signal train comprising a plurality of signal cells, a first of said cells containing a first predetermined code, a first plurality of cells following said first cell each containing a second predetermined code, and a second plurality of cells following the last of said first plurality of cells each containing a third predetermined code; each of said remote substations including first remote receiving means and first remote transmitting means, each of said first remote transmitting means being connected to said first link for transmitting a signal train to a first remote receiving means of the next subsequent remote substation connected to said link, and each of said remote receiving means being connected to said first link for receiving a signal train from the next prior remote substation, each of said remote substations further including first control means connected to the respective first remote receiving means for monitoring the signal train received by the respective remote receiving means, said first control means including first data storage means for storing data to be transmitted by said first remote transmitting means, said first control means being responsive to said first predetermined code in a cell of said signal train to remove said predetermined code from such cell



and to operate the respective first storage means and first remote transmitter means to substitute the contents of the cell previously containing said first predetermined code with data from said first storage means and to insert said first predetermined code into a cell of said signal train immediately following the last cell containing data from the respective first storage means; said central station further including first central receiving means for receiving a signal train from the last of said serially arranged remote substations, storage control means responsive to data in the signal train received by said first central receiving means for forwarding such data to a computer, and queuing means responsive to data in the signal train received by said first central receiving means for operating said first central transmitting means to selectively adjust the proportion of cells containing said second and third predetermined codes.

3,904,830
CALL TRACING AND IDENTIFICATION SYSTEM

Robert H. Every, Sr., Sayre, and Edward J. McCabe, Wellsboro, both of Pa., assignors to Mek-Tronix Laboratories, Mansfield, Pa.

Filed July 3, 1972, Ser. No. 268,670

Int. Cl.² H04M *1/57*

U.S. Cl. 179—18 FH **17 Claims**

1. A call tracing and identification network for a telephone system connected to a calling-party telephone line and a called-party telephone line, said network comprising

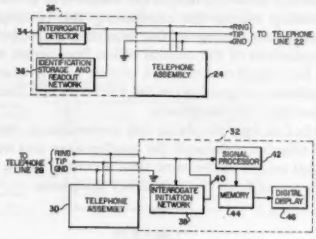
encoder means, connected to the calling-party telephone line, for applying to the called-party telephone line identification signals identifying the calling-party telephone line,

said encoder means including means initiated at the termination of an interrogation signal on the called-party telephone line for controlling the operation of the encoder

means to generate the identification signals only after the interrogation signal; and

a called-party telephone device connected to the called-party telephone line including

a. interrogation means for generating and applying an interrogation signal to the called-party telephone line,



b. means for receiving the identification signal of the calling-party telephone line from the called-party telephone line, and

c. means responsive to the receiving means for displaying a visual identification of the calling-party telephone line.

3,904,831

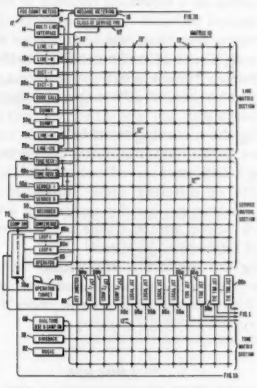
TONE CONTROL ARRANGEMENT FOR ELECTRONIC PABX

Uwe A. Pommerening, Webster, and Glenn L. Richards, Caledonia, both of N.Y., assignors to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed Jan. 9, 1974, Ser. No. 431,885

Int. Cl.[2] H04Q *1/44*

U.S. Cl. 179—18 GF **12 Claims**



4. In an electronic telephone system including a plurality of line circuits, a plurality of junctor circuits, a first switching matrix connected to said line circuits and said junctor circuits and common control means for controlling said switching matrix to connect a line circuit to a junctor circuit and to another line circuit, tone supplying means for applying a selected one of a plurality of tones to said line circuits comprising a plurality of tone generators and a second switching matrix connected to said tone generators and said junctor circuits for selectively connecting a tone generator through a junctor circuit and said first switching matrix to a selected line circuit under control of said common control means, said second switching matrix being formed as a solid state matrix of transistor cross point switches each actuated in response to an enabling signal and an operating signal and reset in response to only an enabling signal.

3,904,832

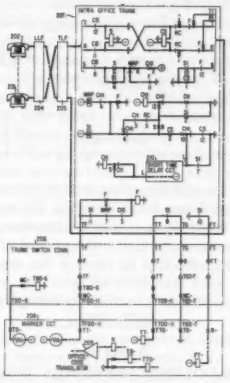
TRUNK CIRCUIT FOR CROSSBAR SWITCHING SYSTEMS

Joseph Rogers Fallon, Pickerington, Ohio, assignor to Western Electric Company, Incorporated, New York, N.Y.

Filed May 2, 1974, Ser. No. 466,490

Int. Cl.[2] H04Q *3/00*

U.S. Cl. 179—18 F **11 Claims**



1. A crossbar trunk circuit for a switching system employing a common switch controlling marker comprising

calling and called party loop supervisory means for supervising the state of respective loop circuits connected to said trunk circuit,

first means controlled by the one of said calling and called party loop supervisory means first detecting the on-hook state of a supervised loop for disconnecting said on-hook supervised loop from said trunk circuit,

second means controlled by said first detecting one of said supervisory means for causing said trunk circuit to indicate an idle condition to said common switch controlling marker, and

means in said trunk circuit operative upon the subsequent seizure of said trunk circuit by said common switch controlling marker for disconnecting the other supervised loop associated with said loop supervisory means which has not yet detected an on-hook condition.

3,904,833

RINGING GENERATOR CIRCUIT WITH CAPACITOR STORAGE

Gerald Wayne Beene, Arlington, Tex., assignor to Superior Continental Corporation, Hickory, N.C.

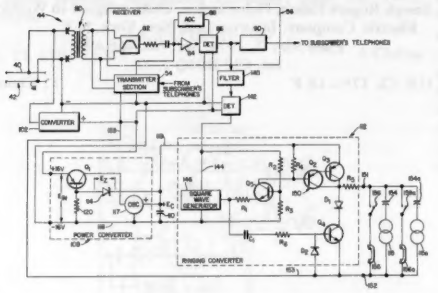
Filed June 4, 1973, Ser. No. 366,665

Int. Cl. H04m *1/26*

U.S. Cl. 179—84 R **31 Claims**

1. A ringing generator circuit for energizing the signalling device of a telephone in a telephone transmission system having (a) a transmission line which provides a connection for transmitting signals between a central office and said telephone, (b) a d.c. power source located at said central office and electrically connected to said line to apply voltage thereto, and (c) means for providing a pre-selected signal to signal an incoming call for said telephone, said ringing generator circuit comprising a capacitor for storing an electrical charge to provide a source of emf for energizing said signalling

device, means responsive to said pre-selected signal to apply the charge stored by said capacitor to energize said signalling device, and circuit means electrically connecting said capacitor to said line to charge said capacitor from said d.c. power source, said circuit means comprising an oscillator having an output connected to one terminal of said capacitor to build up



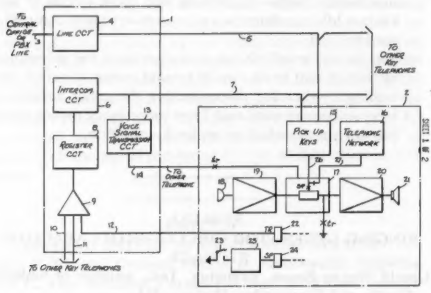
the voltage across said capacitor, a transistor connected to the input of said oscillator for controlling the supply of current thereto, and a zener diode connected between the base terminal of said transistor and said one terminal of said capacitor, said diode being effective to control the amount of current conducted by said transistor to limit the voltage build-up across said capacitor to a pre-selected magnitude.

3,904,834

HANDSFREE LOUDSPEAKING KEY TELEPHONE SET AND A SWITCHING CIRCUIT FOR USE IN A MICROPHONE AND LOUDSPEAKER EQUIPPED KEY TELEPHONE

Tsuyoshi Shinoi, and Toyoshige Murakami, both of Kawasaki, Japan, assignors to Nippon Tsu Shin Kogyo K.K., Japan and TIE/Communications, Inc., Stamford, Conn.

Filed Mar. 23, 1973, Ser. No. 344,212
Claims priority, application Japan, Feb. 10, 1973, 48-16137
Int. Cl.[2] H04M *1/60*
U.S. Cl. 179—99 **6 Claims**



1. A key telephone system comprising

a plurality of key telephones having a telephone network circuit means;

an intercom line circuit means connecting the key telephones;

at least one central office line circuit means having a central office signalling means;

switching means, connected between the central office line circuit means and the key telephone network circuit means, responsive to the central office signalling means for connecting the central office line circuit means to the key telephone network circuit means;

a loudspeaker and microphone circuit means within each key telephone;

intercom signalling means within each key telephone connected to the intercom line circuit means, for selecting and signalling another key telephone; and

switching means, connected between the intercom line circuit means and the loudspeaker and microphone means of each key telephone, responsive to the intercom signalling means for connecting the microphone and loudspeaker means to the intercom line circuit means independent of the central office line circuit means and the key telephone network circuit means when one key telephone is signalled on the intercom line circuit means by another key telephone,

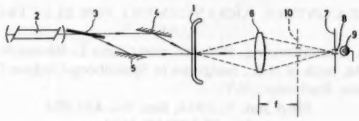
whereby one key telephone can communicate with another key telephone through the loudspeaker and microphone circuit means at the same time a central office line call is in progress from the called key telephone.

3,904,835

RECONSTRUCTION METHOD OF AN OPTICALLY RECORDED SIGNAL

Kazuya Matsumoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 97,956, Dec. 14, 1970, abandoned.
This application Dec. 4, 1972, Ser. No. 311,550
Int. Cl.[2] G11B *7/00;* **H04N** *5/84*
U.S. Cl. 179—100.3 G **11 Claims**



1. A method of reproducing time variations of a control signal recorded on a recording member in the form of corresponding spaced diffraction grid variations along a predetermined scanning direction, which comprises the steps of:

illuminating a part of said recording member with a monochromatic coherent light beam to propagate a plurality of diffracted waves of different order from the recording member;

advancing the recording member in said scanning direction relative to the monochromatic coherent light beam;

directing a diffracted wave front, which is selected from said plurality of different order diffracted waves, onto a photo-electric surface for making an interference fringe pattern whose spaced fringe may be rougher than said spaced diffraction grid; and

detecting the variations in intensity of the interference fringe pattern at the photo-electronic surface while the recording member advances in order to reproduce the time variations of the control signal.

3,904,836

APPARATUS FOR PREFERENTIAL SELECTION AND SWITCHING OF PLURAL RECORDING MACHINES

Said Mohammadioun, Atlanta, Ga., assignor to Lanier Electronic Laboratory, Inc., Atlanta, Ga.

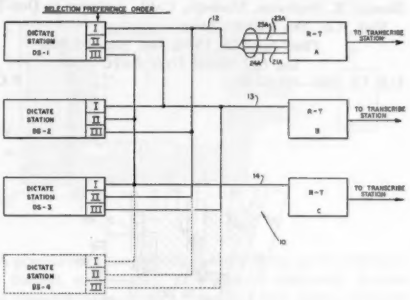
Filed Feb. 1, 1973, Ser. No. 328,717
Int. Cl. G11b *19/00;* **H04m** *11/10*
U.S. Cl. 179—100.1 DR **23 Claims**

1. Apparatus for providing a preferential order of interconnection between the dictation circuit of a dictate station and one of a plurality of message recording units each of which produces a busy signal condition when unavailable for message receiving service, comprising:

switch apparatus having a first switching condition interconnecting a first one of said message recording units to the dictation circuit and having at least one other switching

condition interconnecting another message recording unit to the dictation circuit, said switch apparatus normally operative in the absence of a first switching signal to maintain said first switching condition and being operative in response to a first switching signal to assume said other switching condition;

control switch means associated with the dictate station and selectively operative to produce a control signal indicating desired interconnection between the dictate station and one of the plurality of message recording units; and



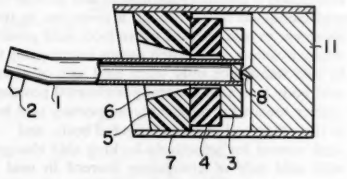
control circuit means connected to receive said control signal and also to receive a busy signal condition produced by said first message recording unit, said control circuit means operative in response to said control signal from said control switch means to apply said busy signal condition to said switch apparatus to provide said first switching signal to operate said switch apparatus to said other switching condition, so that a busy signal produced by the first message recording unit provides selective operation of said switch apparatus.

3,904,837

MAGNETIC PICKUP CARTRIDGE

Toshitaka Sugimoto; Norihiko Takami, and Osamu Hattori, all of Toyokawa, Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 19, 1972, Ser. No. 298,868
Int. Cl.² H04R *11/12*
U.S. Cl. 179—100.41 K **22 Claims**



2. A magnetic pickup cartridge comprising:

vibration means for producing vibrations in response to a sound recording,

said vibration means including an elongated stylus arm having a predetermined dimension perpendicular to the direction of elongation, a stylus secured to a first end of said stylus arm, a magnet coaxially secured to a second end of said stylus arm, said magnet having outer peripheral edge surfaces parallel to the axial direction of said stylus arm, an elongated sleeve means having a stopper secured at a first end of said elongated sleeve means and having a pivot means secured at a second end of said elongated sleeve means, said second end of said stylus arm being arranged within said elongated sleeve such that said magnet is disposed between said stopper and said pivot means, said stopper having an opening larger than said predetermined dimension of said stylus arm, and a resilient supporting member having an opening larger than said predetermined dimension of said stylus arm, said supporting member being arranged within said elongated sleeve between said magnet and said stopper such that said magnet and said supporting member are held against said stopper by said pivot means, thereby enabling vibration of said stylus arm and magnet with respect to said pivot means free of extraneous oscillations in directions other than with respect to said pivot means; and

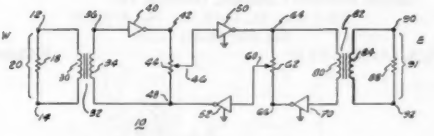
a pair of magnetic circuit means magnetically coupled with said magnet for generating a voltage in response to said vibration of said stylus arm and magnet, each of said pair of magnetic circuit means includes two pole pieces and a yoke connecting said two pole pieces, each of said two pole pieces having a free end surface, said free end surface of each pole piece of each respective pair of magnetic circuit means being in facing relation through an air gap with the outer peripheral edge surface of said magnet, and said free end surface of each pole piece having a dimension in the axial direction of the stylus arm substantially the same as the axial dimension of the outer peripheral surface of said magnet.

3,904,838

TWO-WIRE, BI-DIRECTIONAL VOICE FREQUENCY REPEATER

Alan Stewart, Guelph, Canada, assignor to International Standard Electric Corporation, New York, N.Y.

Continuation of Ser. No. 149,934, June 4, 1971, abandoned. This application July 30, 1973, Ser. No. 384,107
Int. Cl.² H04B *3/36*
U.S. Cl. 179—170 R **5 Claims**



1. A bi-directional signal transmission network comprising a first transformer receptive of input signals across its primary winding for transmission through said network, a first and a second single wire path, said paths being connected to the terminals of the transformer secondary whereby AC input signals received by said transformer primary winding will be inverted in one path relative to signals in the other path, means in said one path for re-inverting signals received from the transformer secondary by said one path, means for combining signals received from said transformer secondary in the other path with said re-inverted signals from said further inverting means and for cancelling any other signals, a unidirectional amplifier in said one path receptive of signals from said combining means for amplifying said received signals, a second transformer, the secondary winding of said second transformer receptive of signals from said amplifier for output transmission in one direction to its primary winding and also receptive of signals induced from its primary winding, one terminal of the secondary winding of said second transformer coupled to the output path from said amplifier and the other secondary winding terminal coupled to said other path wherein signals induced in the secondary winding of said second transformer are inverted in one path relative to the other path and signals conducted from said amplifier output path are not inverted across said secondary winding, re-inverting means in said other path for re-inverting signals in said other path relative to signals in said one path, means for combining signals from said one path with re-inverted signal from

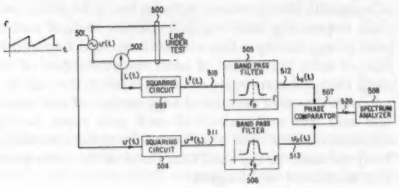
said other path for passing said combined signals and for inhibiting other signals from said other path, and a unidirectional amplifier in said other path receptive of signals passed by said last-mentioned combining means for passage of said signals to the secondary winding of the first-mentioned transformer.

3,904,839

LOOP FAULT LOCATER

John Terrance Peoples, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 18, 1974, Ser. No. 489,580
Int. Cl.[2] H04B *3/46*
U.S. Cl. 179—175.3 F 3 Claims



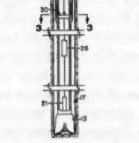
1. A transmission line fault location system comprising:
means for generating a swept-frequency periodic signal proportional to the derivative of the phase of the input impedance of said line with respect to frequency, and
means for measuring the frequencies of the maxima of the power spectrum of said signal.

3,904,840

WELLBORE TELEMETRY APPARATUS

Richard J. Kostelnicek, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.

Filed May 31, 1974, Ser. No. 475,010
Int. Cl.[2] H02G *11/00*
U.S. Cl. 191—12 R 8 Claims



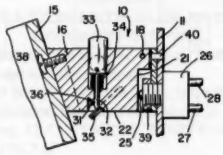
1. Apparatus for use in an electric system employed in a pipe string to conduct electric signal between a subsurface location and a surface location, which comprises a container adapted to be inserted in said pipe string; an insulated electric conductor mounted in said container and having a first portion wound in left-hand coils and a second portion wound in right-hand coils, said conductor being adapted for connection into the electric system; first conductor gripping means for dispensing conductor from the lower end of said container; and second conductor gripping means for dispensing conductor from the upper end of said container, said first and second conductor gripping means being interconnected so that conductor is dispensed from opposite ends of said container at about the same rate.

3,904,841

HANDPIECE HOLDER INCLUDING AUTOMATICALLY RELEASABLE POWER LOCKOUT MEANS

Donald R. Swatman, Modesto, Calif., assignor to Den-Tal-Ez Mgf., Co., Des Moines, Iowa

Filed Apr. 25, 1974, Ser. No. 463,900
Int. Cl.[2] H01H *3/16*; A61C *1/08*
U.S. Cl. 200—61.58 R 5 Claims



1. A holder for a powered handpiece comprising:
a. an elongated rigid body having a first surface extending transversely of the axis of elongation of said body at one end thereof, and a second surface extending along said axis of elongation of said body;
b. support means mounting said elongated body for rotation in a generally vertical plane about an axis extending transversely of said axis of elongation, which axis of rotation is located at one end of said first surface at said one end of said body;
c. switch means rigidly mounted with respect to said support means and adapted to engage said first surface of said body toward the other end thereof from said axis of rotation, said switch means being adapted to resist rotation of said elongated body in a downward direction in said vertical plane beyond a position in which said axis of elongation is generally horizontal and to urge rotation of said elongated body through a given arc in the upward direction in said vertical plane from said generally horizontal position; said switch means interrupting the power to said handpiece only when said axis of elongation of said body is in said generally horizontal position;
d. quiver means for removably supporting said hand-piece at the other end of said elongated body; and
e. lock means for selectively locking said elongated body with said axis of elongation thereof in said generally horizontal position, said lock means comprising a first member rigidly mounted with respect to said support means and extending in a generally horizontal direction transversely of said axis of elongation of said body adjacent said second surface of said body when said axis of elongation of said body is in said generally horizontal position thereof and a second member mounted on said elongated body and selectively extendible from said second surface thereof in a generally vertical direction when said axis of elongation of said body is in said generally horizontal position, said second member when extended in said generally vertical direction, releasably frictionally engaging said first member to prevent rotation of said elongated body in an upward direction in said vertical plane as urged by said switch means.

3,904,842

PRESSURE ACTUATED ELECTRICAL SWITCH WITH CENTRALLY INSULATED CONTACT PORTION

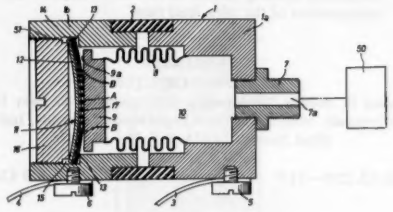
Leonhard Gauer, Zurich, Switzerland, assignor to Gauer AG Electronic, Zurich, Switzerland

Filed Jan. 15, 1974, Ser. No. 433,620

Claims priority, application Switzerland, Jan. 26, 1973, 1160/73

Int. Cl. H01h *35/32*

U.S. Cl. 200—81 R 12 Claims



1. A pressure-actuated electrical switching device comprising a domed, substantially plate-shaped elastically flexible spring element supported at its edge, said spring element having a convex surface, a pressure-actuated member removably contacting said elastic spring element for exerting a pressure force against the convex surface of said spring element, said pressure-actuated member having a surface arranged opposite to the convex surface of said spring element, said convex surface of said spring element being provided at its central region with electrically insulating material, said central region being surrounded by electrically conductive material arranged along the marginal region of said convex surface, said surface of the pressure-actuated member being completely formed of electrically conductive material, said conductive material of said pressure actuated member and said conductive material of said spring element movably contacting each other in accordance with movement of said pressure actuated member.

3,904,843

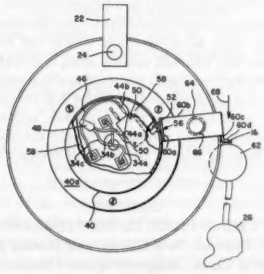
SELF-SWITCHING RETRACTING REEL

Joseph A. Kendechy, Bedford, Ohio, assignor to Benjamin Reel Products, Inc., Garfield Heights, Ohio

Filed Apr. 12, 1974, Ser. No. 460,372

Int. Cl.[2] H01H *3/00*

U.S. Cl. 200—153 F 3 Claims



1. A retracting reel having a housing, a rotating spool mounted within the housing, an electrical cord wound on the spool, and retracting means for urging the spool to wind the cord, wherein the improvement comprises, in combination,

a microswitch having an operating arm and roller means attached to the free end of the arm, said microswitch being mounted on an exterior side face of the housing,

a stop attached to the cord at a point near the end of the cord exterior to the housing,

a lever having a first arm pivotally mounted on said face and a second arm joined to one end of said first arm at substantially a right angle, said second arm positioned to contact the stop at a cord exit opening in the housing, the other end of said first arm having a flanged portion positioned to engage the roller means, said lever pivoting to open the microswitch when the stop is in contact with the second arm and pivoting to close the microswitch when the stop is not in contact with the second arm,

an insulated terminal cover mounted on the housing to enclose said microswitch, said cover having window means formed in its edge through which a portion of the roller extends, and

light means electrically connected to the exterior end of the cord.

3,904,844

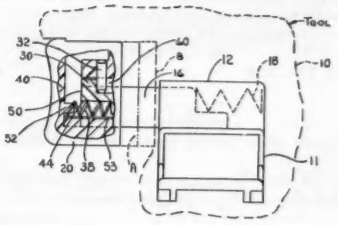
TRIGGER SWITCH WITH LOST MOTION CONNECTION

Edward V. Sahrbacker, Brecksville, Ohio, assignor to Lucerne Products, Inc., Hudson, Ohio

Filed Dec. 26, 1973, Ser. No. 427,930

Int. Cl. H01h *13/08, 3/48*

U.S. Cl. 200—157 5 Claims



1. In an electrical control comprising, a housing, a carrier mounted for movement relative to the housing for causing actuation of the control, a trigger member adapted to be squeezed by the finger of an operator to cause actuation of the carrier, a longitudinally extending passageway formed in said trigger for receiving one end of the carrier, guide means in said passageway for guiding the movement of the trigger relative to the carrier, means interconnecting said carrier and trigger member to provide predetermined pre-travel movement of the trigger relative to the carrier including spring means coacting between the trigger and the carrier for yieldingly resisting movement of the trigger relative to the carrier, abutment means on the trigger and on the carrier adapted for engagement after said predetermined pre-travel of the trigger relative to the carrier effective to cause actuation of the carrier upon further movement of the trigger, and a post on the distal end of said carrier engageable with a pin mounted on said trigger for limiting outward movement of the trigger relative to the carrier.

3,904,845
METHOD AND DEVICE FOR SIMULATING WELDING OPERATIONS

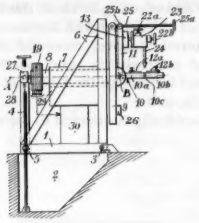
Edmond André Minkiewicz, Paris, France, assignor to Societe Entrepose G.T.M. pour les Travaux Petroliers Maritimes, E.T.P.M., Paris, France

Filed Mar. 28, 1974, Ser. No. 455,864

Claims priority, application France, Aug. 22, 1973, 73.30438

Int. Cl.[2] B23K *9/00*

U.S. Cl. 219—124 **3 Claims**



1. Method of simulating the orbital welding of tubular metal members in a fixed position, consisting in disposing two flat pieces of metal in a common plane with two edges of said flat pieces being placed close to each other, and in pivoting said pieces of metal about an axis extending in a parallel direction to said common plane and simultaneously welding the close edges of said pieces of metal, so that the mass of molten metal successively pass through the same positions as during orbital welding.

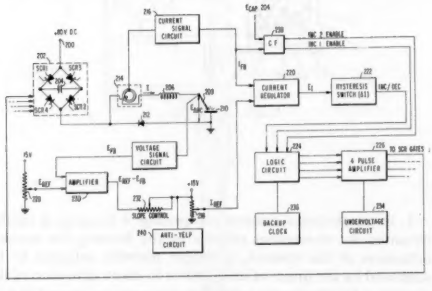
3,904,846
ADAPTIVE CONTROL FOR ARC WELDING

Robert L. Risberg, Brookfield, Wis., assignor to Miller Electric Manufacturing Company, Appleton, Wis.

Filed Dec. 19, 1973, Ser. No. 426,162

Int. Cl.[2] B23K *9/10*

U.S. Cl. 219—135 **11 Claims**



1. A method of spray transfer arc welding wherein a welding electrode is continuously fed toward a workpiece and spray transfer occurs when the welding current exceeds a transition current level and no spray transfer occurs when the welding current is at a very low level, comprising:

a. obtaining a measure of the actual length of the arc;

b. predetermined maximum and minimum lengths of the arc;

c. comparing the measure of the actual arc length with the predetermined minimum and maximum arc lengths, respectively;

d. raising the welding current to a high value above said transition current level when the actual arc length decreases to said minimum arc length, and

e. lowering the welding current to a low value, at which no spray transfer occurs, when the arc length reaches the maximum arc length due to the burnback of the welding electrode when the welding current was above the transition level; whereby the spray transfer is automatically turned on and off to self-regulate the arc length between the predetermined maximum and minimum lengths regardless of the electrode feed rate, and whereby the high value of controlled welding current can be arbitrarily higher than the transition current level and is independent of wire feed rate, and whereby the low value of controlled welding current level is arbitrarily low and also independent of the wire feed rate.

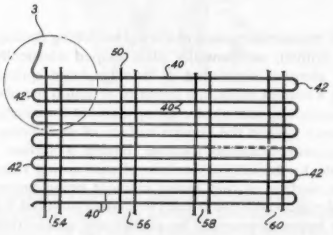
3,904,847
HEATING STRUCTURE

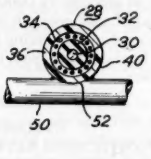
Gerald E. Adams, Mishawaka, Ind., assignor to Easy Heat-Wirekraft, MSP Industries Corporation, Lakeville, Ind.

Filed June 26, 1974, Ser. No. 483,226

Int. Cl. H05b *1/00*

U.S. Cl. 219—213 **9 Claims**





1. A heating structure for embedding in pavement and the like, comprising a heating wire having a metal electrical resistance wire therein and a layer of thermoplastic material surrounding said resistance wire forming the outer layer, said heating wire being arranged in a predetermined configuration of spaced sections interconnected to one another at their ends and defining open areas through which the material of the pavement and the like will readily pass, a plurality of individual strands of thermoplastic material applied separately to and interconnecting said spaced sections for retaining said sections in said predetermined configuration, and a bond formed by fusion between said strands and said thermoplastic outer layer of the heating wire at the point of contact therebetween.

3,904,848
CIGAR LIGHTER IGNITING UNIT

Laurence G. Horwitt, New Haven, and Donald J. Mattis, Norwalk, both of Conn., assignors to Sun Chemical Corporation, New York, N.Y.

Filed Aug. 19, 1974, Ser. No. 498,293

Int. Cl.[2] F23Q *7/22*

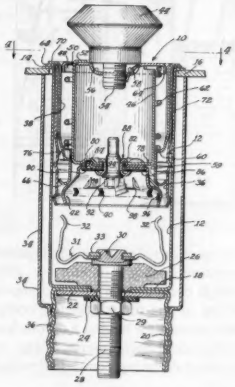
U.S. Cl. 219—267 **4 Claims**

1. A low-cost, automated-production, automatic electric cigar lighter igniting unit comprising, in combination:

a. a metal plug body having a metal heating-element cup insulatedly carried at its inner end, said cup constituting one contact of an electrical heating element circuit and the metal plug body constituting another contact of said circuit,

b. an electrical heating element of resistance ribbon disposed in said cup and having its ends connected respectively to the plug body and cup to be energized therethrough,

c. a metal friction sleeve member surrounding said plug body in electrical contact therewith and axially movable with respect thereto,



d. a cylindrical metal ashguard member surrounding and axially movable on the friction sleeve member and in electrical contact therewith, said ashguard member being movable with respect to the plug body and friction sleeve member between advanced and retracted positions,

e. one of said members having at least three elongate metal guide ribs extending lengthwise thereof and electrically engaging the other member to constitute a non-binding sliding bearing of relatively small area and contact between the members, and,

f. supplemental sliding bearing means on said members, normally spaced from said ribs and providing an additional bearing to prevent canting of the ashguard when it is in its advanced position on the plug body.

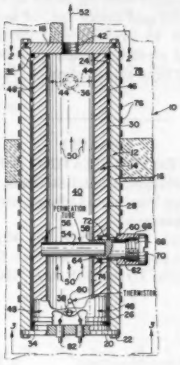
3,904,849

TEMPERATURE CONTROLLED ELECTRIC FLUID HEATING APPARATUS

Daniel P. Lucero, Triangle, and Alan R. Teets, Springfield, both of Va., assignors to Meloy Laboratories, Inc., Springfield, Va.

Filed Jan. 2, 1973, Ser. No. 320,624
Int. Cl. H05b *1/02*; **F24h** *3/04*
U.S. Cl. 219—299 **8 Claims**

1. Apparatus for providing precise control of the temperature of a fluid, which comprises a cylindrical housing, a hollow cylindrical core in said housing with a side wall thereof spaced from a side wall of the housing to provide a thin flow passage therebetween along the length of the core and the housing, means for closing said passage at one end thereof, means for admitting fluid to said passage adjacent to said one end thereof, closure means for the housing adjacent to the opposite end of the passage, means for providing communication between the opposite end of the passage and the interior of the core, means for providing a fluid outlet from the core adjacent to said one end of the passage, heater means secured to the outer surface of the side wall of the housing, means for insulating the housing from the ambient, means in said housing for sensing the temperature of fluid which has passed along said



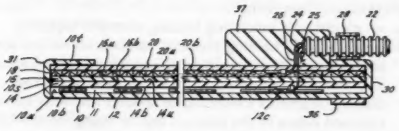
passage, and means responsive to said temperature sensing means for controlling said heater means.

3,904,850

FLEXIBLE HEATER PANEL

Ben C. Johnson, San Marcos, Tex., assignor to Thermon Manufacturing Company

Filed Mar. 11, 1974, Ser. No. 449,772
Int. Cl.² H05B *3/34*
U.S. Cl. 219—528 **2 Claims**



1. A flexible heating panel comprising:

a first electrical insulating layer serving as the base of the panel;

a flexible heating tape for heating, overlying said first layer;

a second electrical insulating layer, overlying said flexible heating tape;

a flexible, electrically grounding material for electrically grounding the heating tape in case of accidental penetration of the panel, said grounding material overlying said second layer;

a third electrical insulating layer overlying said grounding material and having a bottom face and an upper face, said upper face serving as the top of the panel;

said second electrical insulating layer includes:

a heater element insulating layer mounted with said flexible heating tape, said heater element insulating layer being formed with said first electrical insulating layer into a heater element layer; and

a ground insulating layer mounted with said grounding material, said ground insulating layer being formed with said third electrical insulating layer into a ground layer, said heater element insulating layer and said ground insulating layer being laminated together;

said first electrical insulating layer includes overlapping, protective portions folded about and adjacent to the end portions of the panel to protect and enclose all of said layers, said overlapping, protective portions being attached to said upper face of said third electrical insulating layer;

electrical leads of an electrical power line and means connecting said leads to said heating element and said grounding material; and

clamp means mounted with the panel to fasten said electrical power line to said upper face of said third electrical insulating layer to prevent said electrical connection means and said electrical leads from becoming inadvertently detached from said heating tape and said grounding material.

3,904,851

ELECTRIC HEATER FOR HEATING A FLUID MEDIUM

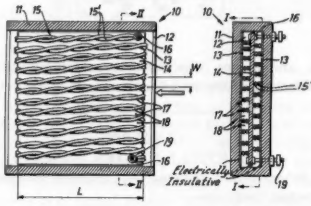
Karl Åke Sture Gustafson, Chatel-St-Denis, Switzerland, and Johan Eric Hayden Westbert, Lidingo, Sweden, assignors to Separex SA, Switzerland

Filed Oct. 2, 1973, Ser. No. 402,804

Claims priority, application Sweden, Oct. 5, 1972, 12823/72

Int. Cl. H05b *3/10;* **F24h** *3/04;* **H01c** *3/00*

U.S. Cl. 219—374 **8 Claims**



1. An electrical heater for heating a fluid medium flowing therethrough comprising:

a. an electrically insulating heating element support;

b. a filamentary heating element, twisted about the length of the element, mounted on the heating element support and including a plurality of parallel heating-current conducting segments extending in spaced relations between opposed edges of the support and in engagement with at least one face of the support, the length of said segments being more than twice the spacing of adjacent segments; and

c. an electrical insulating cover layer having one face thereof in engagement with said segments and uniformly spaced from said face of the heating element support;

the heating element segments defining between the heating element support and the cover layer a plurality of helically walled parallel passages for the passing of the fluid medium to be heated, the passing being parallel to said walls from one of said edges of the heating element support to the other, said passages having a dimension transverse of said faces substantially equal to the maximum cross-sectional dimension of the heating element segments.

3,904,852

DEEP FAT FRYING COOKING CONTROL MODULE

Louis E. Rivelli, Shelton, and Miles J. Barnes, Woodbridge, both of Conn., assignors to Food Automation-Service Techniques, Inc., Stratford, Conn.

Filed Feb. 3, 1975, Ser. No. 546,501

Int. Cl.² F27D *11/02*

U.S. Cl. 219—442 **4 Claims**

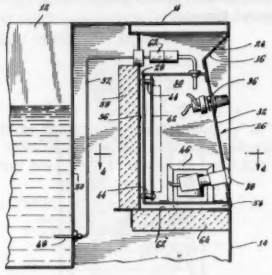
1. In a deep fat fryer cooking system including a deep fat frying kettle and heating means for heating the same, a housing substantially enclosing the bottom and four sides of the kettle and having a panel in proximity to a side of the kettle, the panel carrying kettle on-off and temperature controls and the like, the improvement of a heat sensitive solid state electrical circuitry deep fat frying cooking timing control computer module located in the panel, comprising:

a chamber defined essentially by the frying kettle, the panel and the housing,

the chamber being adapted to provide convection air flow for cooling of the frying kettle,

a thermally insulated compartment within the chamber,

the compartment being sealed from communiation with the chamber so as to define a dead air space therein,



the temperature of the air within the chamber being above that temperature having a deleterious effect on the solid state electrical components of the computer,

the temperature of the air within the compartment being below that temperature having a deleterious effect on the solid state electrical components of the computer, and

the computer module being positioned within the compartment.

3,904,853

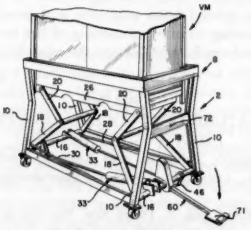
STAND FOR TRANSPORTING AND STORING A MACHINE

Ransom F. Shoup, Bryn Mawr, Pa., and Henry D. Luther, Massillon, Ohio, assignors to R. F. Shoup Corporation, Ridley Park, Pa.

Filed Jan. 31, 1974, Ser. No. 438,431

Int. Cl.² G07C *13/00*

U.S. Cl. 235—51 **6 Claims**



1. A voting machine comprising:

doors which open to provide a voter access to the voting levers therein,

a frame, said frame blocking access to said doors when said machine is disposed in a lowered position within said frame,

rotor means rotatably mounted at the bottom of said frame,

a toggle mechanism coupled to said rotor and affixed to said machine so that rotation of said rotor extends said toggle mechanism, and

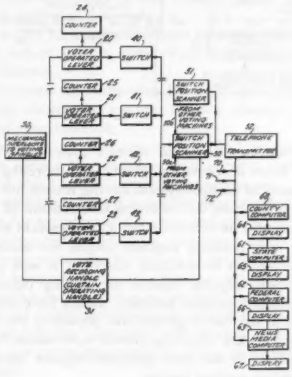
a lever having one end adapted to selectively engage said rotor whereby movement of the other end of said lever raises said machine upwardly out of said frame into a

position in said doors and the voting levers therein are accessible.

3,904,854
AUTOMATIC MECHANICAL VOTING MACHINE WITH ELECTRONIC READOUT

Earl H. Smith, Jr., Levittown, Pa., assignor to International Election Systems Corporation, Burlington, N.J.

Filed June 18, 1973, Ser. No. 370,835
Int. Cl.² G07C *13/00*
U.S. Cl. 235—54 F **11 Claims**



1. A voting machine comprising, in combination:

a plurality of individual vote casting members disposed in a given array and each being operable between a no vote and a vote position;

a vote recording member operable from a vote enabling position to a vote recording position for recording the votes cast by a given voter by operating the said array of vote casting members;

respective mechanical counter means connected to each of said vote casting members; each of said mechanical counter means being advanced by one count each time its said respective vote casting member is in its said vote position and said vote recording member is operated to said vote recording position;

interlock means connected to at least selected of said vote casting members whereby only a preselected number of said selected vote casting members can be operated to said vote position at one time;

a plurality of switch means respectively connected to said plurality of vote casting members; each of said plurality of switch means being operable between first and second switch positions as their corresponding vote casting member is operated between its said no vote position and its said vote position, respectively;

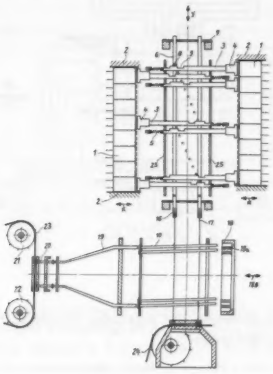
scanning means connected to said plurality of switch means and operable to scan the condition of each of said switch means when said vote recording member is operated to said vote recording position;

and electronic data processing means connected to said scanning means for tabulating and displaying the total votes cast by each of said vote casting members.

3,904,855
READ-IN SYSTEM FOR THE CONTROL OF CARD-PUNCHING MACHINE, JACQUARD MACHINES AND THE LIKE

Werner Geirhos, Senden, Germany, and Frans Eggermont, Waregem, Belgium, assignors to Fa Grosse Webereimaschinen GmbH, Neu Ulm, Germany

Filed July 16, 1973, Ser. No. 379,302
Int. Cl.² G06K *17/00;* **D03G** *13/00;* **G06K** *1/14*
U.S. Cl. 235—61.6 K **12 Claims**



3. A read-in apparatus for control of a plurality of selectively displaceable elements, especially in a card-punching or Jacquard machine, said apparatus comprising

a set of selectively energizable magnets;

a set of armatures each juxtaposed with a respective one of said magnets;

means for displacing one of said sets toward the other of said sets to bring each of said armatures into contact with the respective magnet whereby at least some of said armatures are retained by respective magnets under magnetic adhesion force;

means operatively connecting said armatures to said selectively displaceable elements; and

means for displacing said one of said sets including a mechanical drive coupled to the drive of said machine, said magnets being permanent magnets each provided with a demagnetization coil.

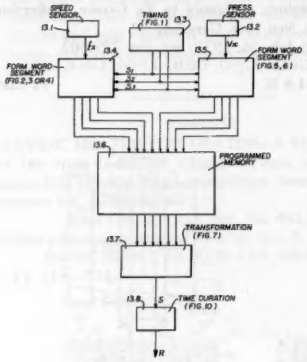
3,904,856
CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Louis Monpetit, L'Etang-la-Ville, France, assignor to Societe des Procedes Modernes d'Injection Sopromi, Clichy, France

Filed Dec. 5, 1973, Ser. No. 422,062
Claims priority, application France, Dec. 6, 1972, 72.43329; June 4, 1973, 73.20169; June 6, 1973, 73.20514
Int. Cl.² F02D *5/00;* **G06F** *15/46*
U.S. Cl. 235—150.21 **28 Claims**

1. A control system for an internal combustion engine including at least two sensor means for respectively producing information corresponding to physical quantity representations of operating conditions of the engine comprising, means for sampling the information supplied by a respective sensor means at a predetermined frequency, means for coding each of the respectively sampled informations into a word segment having a limited number of digits, the mean value of the word segments from several samplings being representative of the mean value of the corresponding physical quantity, means for grouping the word segments to form a first complete word, programmed memory means for converting the first word into a second word, means for transforming the second word into

a function whose mean value is representative of the mean value of a desired regulating function for the engine, and



means for converting the regulating function into a control quantity for the engine.

3,904,857

MEASURING APPARATUS FOR TIMBER GRINDING MILLS

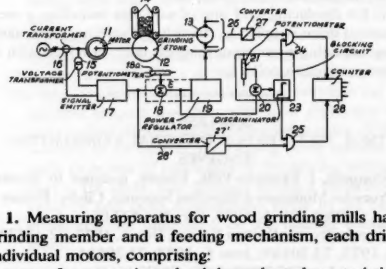
Henry Sandblom, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Continuation of Ser. No. 782,802, Dec. 11, 1968, abandoned. This application July 5, 1973, Ser. No. 376,294

Claims priority, application Sweden, Dec. 19, 1967, 17383/67

Int. Cl.[2] B02C *19/20, 25/00*

U.S. Cl. 235—151.1 **5 Claims**



1. Measuring apparatus for wood grinding mills having a grinding member and a feeding mechanism, each driven by individual motors, comprising:

means for measuring a load-dependent characteristic value for each of said motors;

first signal generating means, coupled to said measuring means, for generating first output signals representative of the measured characteristic value of each of said motors;

second signal generating means, coupled to said first signal generating means, and responsive to said first output signals, for generating second output signals representative of a measured value characteristic for said measuring apparatus; and

means, coupled to said first signal generating means, for blocking transmission of said first output signals to said second signal generating means when said first output signals exceed a predetermined value.

3,904,858

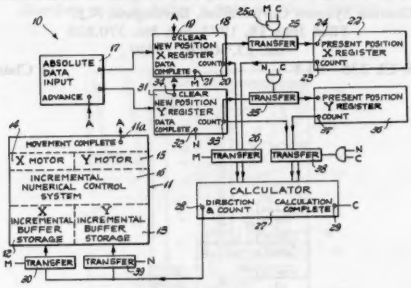
ABSOLUTE NUMERICAL CONTROL SYSTEM

Hermann Rosshirt, Bristol, Conn., assignor to The Superior Electric Company, Bristol

Filed Feb. 21, 1974, Ser. No. 444,695

Int. Cl. H02p *5/46;* **G05b** *19/18*

U.S. Cl. 235—151.11 **6 Claims**



1. An absolute numerical control system for producing movement from absolute information comprising an incremental numerical control system having means for producing movement and means for receiving information of the extent of an incremental movement from a last position to a present position, a new position register means for accepting and storing information in absolute form for a new position, a present position register means for storing information in abscolute form of a present position, means for comparing the information in the two registers and providing the difference therebetween to the receiving means and means for shifting the information in the new position register means to the present position register means.

3,904,859

METHOD AND APPARATUS FOR MEASURING THE IMPEDANCE OF A LINE

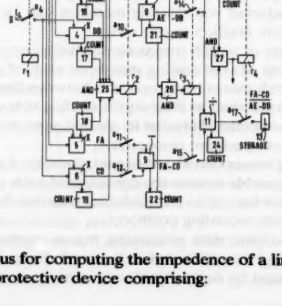
Robert Poncelet, Brussel, Belgium, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Sept. 24, 1973, Ser. No. 399,845

Claims priority, application Germany, Sept. 29, 1972, 2247746

Int. Cl. G06g *7/34*

U.S. Cl. 235—151.31 **3 Claims**



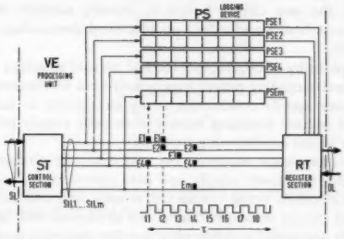
2. Apparatus for computing the impedence of a line for use in a system protective device comprising:

a. means for providing a first output signal proportional to the line voltage;
b. means for providing a second output signal proportional to the line current;
c. first means for sampling and storing said first output signal at first time interval;
d. second means for sampling and storing a plurality of instantaneous values of said second output signal during said first time interval;
e. first means for computing a mean current from said plurality of instantaneous values;
f. second means for computing from said instantaneous values a first current rate of change corresponding to the current rate of change during said first time interval;
g. third means for sampling and storing said first output signal at a second time interval;
h. fourth means for sampling and storing a plurality of instantaneous values of said second output signal during said second time interval;
i. third means for computing from said plurality of instantaneous values a mean value of current during said second time interval;
j. fourth means for computing from said plurality of instantaneous values the current of rate change during said second time interval;
k. means to sequentially operate said first, second, third and fourth means for sampling and storing and said first, second, third and fourth computing means;
l. a first multiplier having as inputs the output of said fourth means for sampling and storing and said fourth means for computing and providing as an output a first product;
m. a second multiplier having as inputs the output of third means for sampling and storing and said second means for computing and providing as an output a second product;
n. a third multiplier having as inputs the output of said third means for sampling and storing and said fourth means for computing and providing as an output a third product;
o. a fourth multiplier having as inputs the output of said third means for computing and said second means for computing and providing as an output a fourth product;
p. a fifth multiplier having as inputs the output of said third means for sampling and storing and the output of said first means for computing and providing as an output a fifth product;
q. a sixth multiplier having as inputs the output of said first means for sampling and storing and the output of said third means for computing and providing as an output a sixth product;
r. a first substractor having as inputs said first and second products and providing as an output the difference therebetween as a first intermediate value;
s. a second substractor having as inputs said third and fourth products and providing the difference therebetween as a second intermediate value;
t. a third subtractor having as inputs said fifth and sixth products and providing as a third intermediate value the difference therebetween;
u. a first divider having as inputs said third intermediate value and said first intermediate value and providing as an output said first intermediate value divided by said third intermediate value, said output representing the resistive component of line impedance;
v. a second divider having as inputs said third intermediate value and said second intermediate value and providing an output which is said second intermediate value divided by said third intermediate value, said output representing the inductive component of said line impedance;
w. first storage means coupled to the output of said first dividing means for storing said resistive component; and
x. second storage means coupled to the output of said second dividing means for storing said inductive component.

3,904,860
METHOD FOR DIAGNOSING THE CONDITION OF DATA PROCESSORS

Josef Huber, and Gerd Steinmann, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 26, 1973, Ser. No. 419,088
Claims priority, application Germany, Dec. 14, 1972, 2261211
Int. Cl. G06f *11/06;* **G01r** *29/18;* **G05b** *23/02*
U.S. Cl. 235—153 AC **7 Claims**



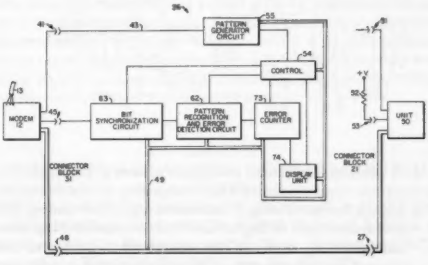
1. A method of operation of a data processing apparatus in order to carry out a diagnosis of its operating condition, said data processing apparatus having at least one main memory over which processing units coact in cycles under control of a program control unit, said processng units generating control signals for executing instruction-controlled routines in accordance with the program being run, said control signals being transmitted to individual registers in register units in said processing units for the execution of elementary operations, the method comprising the steps of:

recording the said control signals for each said elementary operation, with reference to time, in a logging device during the operation of either a diagnostic routine, the operation of said data processing apparatus or both, and transferring the contents of said logging device to an area of said main memory in conjunction with the contents of corresponding registers in said register unit.

3,904,861
PRINTED CIRCUIT BOARD TESTING UNIT

John E. McNamara, Acton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Mar. 13, 1974, Ser. No. 450,585
Int. Cl.² H04M *3/26;* **G08C** *25/02*
U.S. Cl. 235—153 AC **4 Claims**



1. In a data communications system including a communications link, a data unit with a power supply and coupling means for transmitting and receiving digital data, said data unit including a plurality of connector blocks for circuit boards and connectors, and a signal conditioning unit on one

circuit board adapted for connection to one of said connector blocks to couple data to and from the communications link, the signal conditioning unit including coupling means for receiving data and power from the data unit through the one connector block and for transmitting data to the data unit through the one connector block, the improvement comprising:

A. an extender circuit board,

B. first means on said extender circuit board for engaging the one connector block to thereby support said extender circuit board in electrical connection to the data unit,

C. second means on said extender circuit board for engaging the one circuit board to thereby support the one circuit board and effect an electrical connection therewith,

D. a plurality of conductors formed on said extender circuit board including power supply and data conductors, said power supply conductors being connected to said first and second engaging means to thereby supply power to the signal conditioning unit, and

E. circuit means mounted on said extender circuit board including power supply and data connections, said data connections being connected to said data conductors so said circuit means is connected in circuit with the data unit and signal conditioning unit for receiving and transmitting digital data to and from the coupling means in the data unit and signal conditioning unit and said power supply connections being connected to said power supply conductors whereby the signal conditioning unit receives power from the data unit.

3,904,862

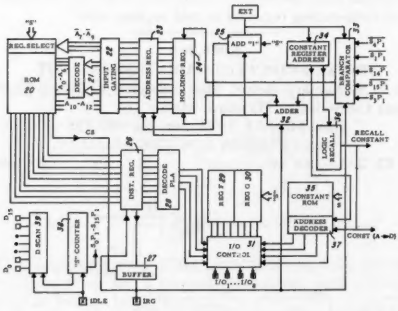
CALCULATOR SYSTEM HAVING A CONSTANT MEMORY

Michael J. Cochran, Richardson, and Charles P. Grant, Jr., Dallas, both of Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Filed Sept. 13, 1973, Ser. No. 397,181

Int. Cl.[2] G06F *9/10*

U.S. Cl. 235—156 **12 Claims**



1. A portable electronic calculator system implemented on at least one semiconductor chip comprising in combination:

a. means for generating a command signal containing first and second sets of digits, said first set representing internal operating states of the calculator system and said second set representing a memory address conditioned upon a digit of said first set;

b. an instruction memory for storing a large number of instruction words and providing a selected one in response to said command signal; and

c. constant memory means also responsive to said command signal for generating a multi-digit, multi-bit constant for execution in said calculator system.

3,904,863

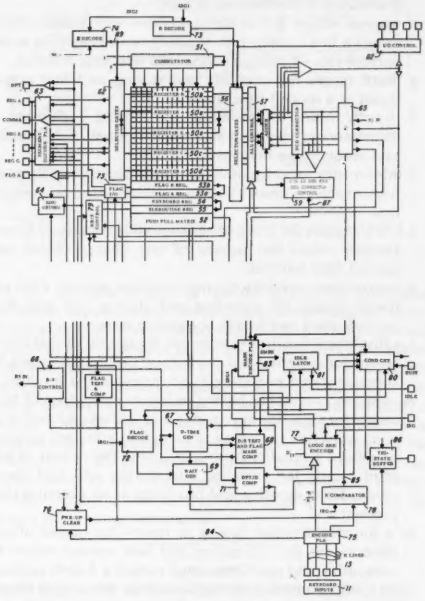
CALCULATOR SYSTEM USING INSTRUCTION WORDS AS DATA

Michael J. Cochran, and Charles P. Grant, Jr., both of Dallas, Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.

Filed Sept. 13, 1973, Ser. No. 397,465

Int. Cl. G06f *13/00*

U.S. Cl. 235—156 **11 Claims**



1. A portable electronic calculator system implemented on at least one semiconductor chip comprising:

a. permanent storage means for storing multi-bit instruction words;

b. data storage means for storing multi-bit data words;

c. decode means, coupled to the permanent storage means for receiving and decoding the instruction words and for selectively providing a control signal and specified bits of each instruction word;

d. multi-purpose storage means coupled to the decode means to selectively receive the specified bits, under control of the control signal; and

e. arithmetic means, coupled to the data sotrate means and to the multi-purpose storage means for receiving selected data words and the specified bits for performing arithmetic operations thereon.

3,904,864

VEHICLE LAMP ASSEMBLIES

Kenneth James Jones, 11 Aragon Dr., Sutton Coldfield, Warwickshire, and Robert Arthur Hargroves, 52 Rowlands Crescent, Solihull, Warwickshire, both of England

Filed May 28, 1974, Ser. No. 474,104

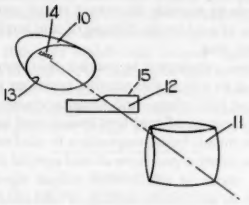
Claims priority, application United Kingdom, May 29, 1973, 25438/73

Int. Cl.[2] B60Q *1/00, 3/00, 11/00;* **F21V** *12/04*

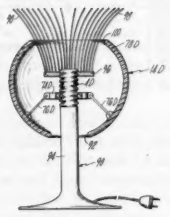
U.S. Cl. 240—7.1 R **4 Claims**

1. A vehicle lamp assembly comprising a dished reflector which is at least partially ellipsoidal in shape and has an inner focal plane and an optical axis, and an electric filament disposed in said dished reflector at said inner focal plane thereof,

said electric filament having an axis which extends transversely with respect to a horizontal plane containing the optical axis of the reflector, said filament being inclined at an angle of 30° to 45° inclusive with respect to said horizontal plane.



3,904,865
THREADED BULB COVER DEVICE
Jack N. McCarthy, Meadowood Rd., Tolland, Conn. 06084
Division of Ser. No. 361,629, May 18, 1973, Pat. No. 3,808,419, which is a continuation-in-part of Ser. No. 185,934, Oct. 4, 1971, Pat. No. 3,757,105. This application Mar. 21, 1974, Ser. No. 453,523
Int. Cl.² F21V *3/00*
U.S. Cl. 240—10 L **4 Claims**



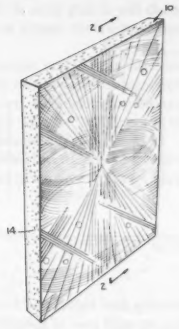
3. A cover device for a bulb with external threads therealong, said cover device including a member having an opening with internal threads extending along an axis for receiving external threads of a bulb, said member being capable of transmitting light in a direction transverse to said axis, fiber optic filaments being fixed to said member, said fiber optic filaments having one end extending into said member for receiving light through said member from within said opening having internal threads.

3,904,866
TRANSLUCENT STRUCTURAL PANELS
Dorothy E. Hayes, 30 E. 4th St., New York, N.Y. 10003
Filed Oct. 29, 1974, Ser. No. 519,021
Int. Cl.² A47G *33/16*
U.S. Cl. 240—10 L **7 Claims**

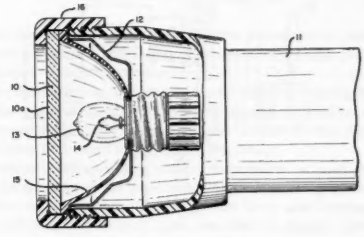
1. An architectural panel comprising:

A. a sealed shallow box of parallelepiped shape and predetermined depth formed by a pair of sides, a pair of ends and top and bottom faces secured to the ends and sides, said box being fabricated of transparent material, and

B. discrete optical elements encapsulated within said box, said elements being composed mainly of rods of transparent material whose ends lie adjacent the sides of the box to intercept light incident thereto, said rods being deployed in said box in the form of compressible stacked layers, each constituted by a planar assembly of rods in a predetermined pattern which is different from the patterns of the other layers, the overall thickness of the stacked layers being slightly greater than the depth of said box, said layers being sandwiched and compressed by said faces to hold said layers in place.



3,904,867
FLASHLIGHT WITH SEMI-TRANSPARENT LENS
Kenneth G. Salem, 226 Belmont St., Johnstown, Pa. 15904
Filed Apr. 4, 1974, Ser. No. 457,894
Int. Cl.² F21L *1/00, 15/00*
U.S. Cl. 240—10.6 R **1 Claim**



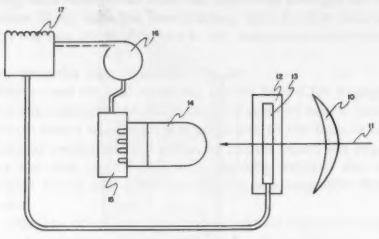
1. A flashlight having a smooth highly polished reflector at one end thereof, said reflector having a large open end and a smaller opposite open end and adapted to receive a flashlight bulb therein for projection of light from said bulb through the large open end of said reflector and forming a spot light beam, the large open end of said reflector being completely closed by a planar non-glare glass lens having at least one surface thereof etched to diffuse the light issuing from said reflector large open end, thereby creating a softly diffused shadow-free light which is essentially free of multiple images in the center of the beam of light forming said spot.

3,904,868
CONTINUOUSLY VARIABLE, REVERSIBLE OPTICAL FILTER
William S. McEwan, and Peter R. Hammond, both of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.
Filed Oct. 21, 1974, Ser. No. 516,221
Int. Cl.² G01J *1/26;* **G02B** *5/22*
U.S. Cl. 250—201 **3 Claims**

1. A continuously variable, reversible optical filter device comprising:

a. a filter containing a pair of gaseous materials, one an electron acceptor and the other having the ability to donate electrons;

b. means for sensing the amount of light passing through said filter translating the senses received into a useable signal and forwarding said signal;



c. means for receiving said signal and increasing or decreasing the pressure on said pair of gaseous materials according to the signal received.

3,904,869

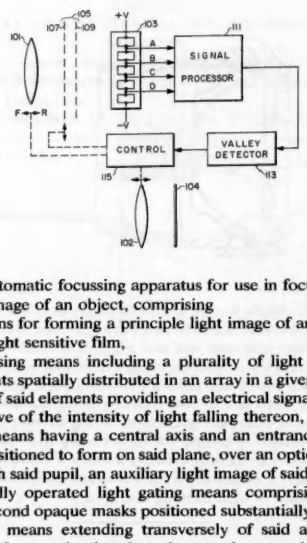
FOCUS DETECTING APPARATUS

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 9, 1973, Ser. No. 404,319

Int. Cl. G01j 1/36

U.S. Cl. 250—204 **7 Claims**



6. An automatic focussing apparatus for use in focussing a principle image of an object, comprising

lens means for forming a principle light image of an object on a light sensitive film,

light sensing means including a plurality of light sensing elements spatially distributed in an array in a given plane, each of said elements providing an electrical signal representative of the intensity of light falling thereon,

optical means having a central axis and an entrance pupil and positioned to form on said plane, over an optical path through said pupil, an auxiliary light image of said object,

cyclically operated light gating means comprising first and second opaque masks positioned substantially at said optical means extending transversely of said axis and spaced from each other therealong, and arranged to have cyclic reciprocating relative motion in the direction of their length, each of said masks including a plurality of slit apertures along its length so that said cyclic motion causes said gating means to cyclically block predetermined spatially separate areas of said entrance pupil of said optical means, to cause light from said object to reach said sensing means cyclically from said spatially separate areas and to cause said auxiliary image and hence the distribution of light to shift cyclically over said array of sensing elements to an extent dependent upon the extent to which said auxiliary image is out of focus on said plane, said auxiliary image and light distribution remaining substantially stationary on said array of sensing elements, notwithstanding said cyclic operation of said gating means, when said auxiliary image is in focus on said plane,

means connected to said sensing elements and responsive to said signals to provide an output signal representative of the extent of said cyclic shifting of said auxiliary image on said plane, and

control means connected to receive said output signal and connected to adjust the relative positions of said optical means and said plane, and simultaneously to adjust the relative positions of said lens means and said film,

said control means being responsive to said output signal to adjust the relative positions of said optical means and said plane to those at which said output signal indicates a minimum in said cyclic shifting of said auxiliary image on said plane, the corresponding adjusted relative positions of said lens means and said film then being those which cause said principle image to be focussed on said film.

3,904,870

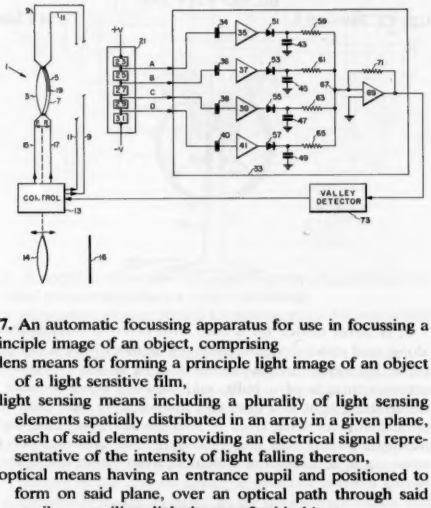
FOCUS DETECTING APPARATUS

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Oct. 9, 1973, Ser. No. 404,320

Int. Cl. G01j 1/36

U.S. Cl. 250—204 **7 Claims**



7. An automatic focussing apparatus for use in focussing a principle image of an object, comprising

lens means for forming a principle light image of an object of a light sensitive film,

light sensing means including a plurality of light sensing elements spatially distributed in an array in a given plane, each of said elements providing an electrical signal representative of the intensity of light falling thereon,

optical means having an entrance pupil and positioned to form on said plane, over an optical path through said pupil, an auxiliary light image of said object,

cyclically operated light gating means positioned substantially at said optical means to cyclically block predetermined spatially separate areas of said entrance pupil of said optical means, to cause light from said object to reach said sensing means cyclically from said spatially separate areas and to cause said auxiliary image and hence the distribution of light to shift cyclically over said array of sensing elements to an extent dependent upon the extent to which said auxiliary image is out of focus on said plane, said auxiliary image and light distribution remaining substantially stationary on said array of sensing elements, notwithstanding said cyclic operation of said gating means, when said auxiliary image is in focus on said plane,

means connected to said sensing elements and responsive to said signals to provide an output signal representative of the extent of said cyclic shifting of said auxiliary image on said plane, and

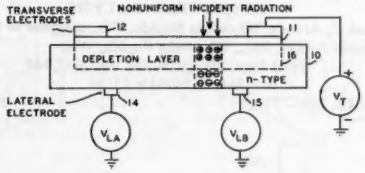
control means connected to receive said output signal and connected to adjust the relative positions of said optical means and said plane, and simultaneously to adjust the relative positions of said lens means and said film,

said control means being responsive to said output signal to adjust the relative positions of said optical means and said plane to those at which said output signal indicates a minimum in said cyclic shifting of said auxiliary image on said plane, the corresponding adjusted relative positions of said lens means and said film then being those which cause said principle image to be focussed on said film.

3,904,871
TARGET LOCATING CIRCUIT USING A LATERAL PHOTOELECTRIC DIODE

James E. Dueker, Florissant, and Richard H. Glaenzer, University City, both of Mo., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 5, 1974, Ser. No. 486,250
Int. Cl.² H01J *39/12*
U.S. Cl. 250—211 J **8 Claims**



1. An improved target locating circuit comprising:

a. a lateral photoelectric diode having first and second sides;

b. said diode having a light sensitive surface on said first side;

c. first, second, third and fourth electrodes positioned on said second side spaced from each other;

d. a fifth electrode on the first side of said diode;

e. means for biasing said diode coupled to said electrodes to cause a depletion region to exist within said diode;

f. means for imaging a light source upon said light sensitive surface;

g. means for interrupting said light source image at a predetermined rate;

h. means connected to said first, second, third and fourth electrodes to measure the time of arrival at said first, second, third and fourth electrodes of electrical signals caused by said imaged light source on said active surface; and,

i. means for comparing said time of arrival at said first, second, third and fourth electrodes coupled to said first, second, third and fourth electrodes to display the position of said light source upon said light sensitive surface and thereby determining its location.

3,904,872
DETECTOR FOR LUMINESCENT PATTERNS COMPRISING A COLOR DETECTOR RESPONSIVE TO COLOR COMPONENTS OF PREDETERMINED COLORS OF THE LUMINESCENCE

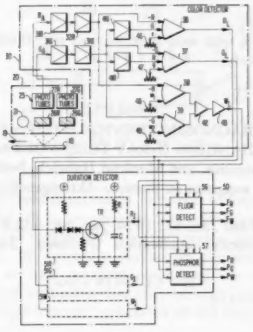
Rinzou Ebukuro; Tomoyuki Isono, and Tetsuo Omiya, all of Tokyo, Japan, assignors to Nippon Electric Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 210,907, Dec. 22, 1971, abandoned. This application Nov. 21, 1973, Ser. No. 417,839
Claims priority, application Japan, Dec. 29, 1970, 45-121098
Int. Cl.² G01J *3/34*
U.S. Cl. 250—226 **4 Claims**

1. An electro-optical detection device which is capable of discriminating between a plurality of patterns having different luminescent materials thereon, each luminescent material, when excited, emitting luminescence whose color is identical to one of a plurality of predetermined colors and whose persistence characteristic is such that it will decay to zero luminescence in less than or longer than a predetermined time, comprising:

a plusating radiation source for directing radiation upon said patterns to excite said luminescent materials thereon for luminescence, said radiation having a predetermined pulse frequency with its "off" period of each cycle equal to said predetermined time;

photosensitive detector means responsive to the luminescence from said luminescent materials for generating first



electric signals proportional to the intensities of predetermined color components of which each of said predetermined colors is composed;

color detecting means responsive to said first electric signals for generating second electric signals indicative of the presence of said predetermined colors in the luminescence from said luminescent materials;

duration distinguishing means responsive to said second electric signals for generating third electric signals indicative of whether the luminescence from said luminescent materials has a decay time less than or longer than said predetermined time; and

recognition means responsive to said second and third electric signals for recognizing said plurality of patterns.

3,904,873
OPTICAL ARRANGEMENT

David George Anthony Demaine, Leeds, and John Allan Hall-Jackson, Acomb, both of England, assignors to The Rank Organisation Limited, London, England

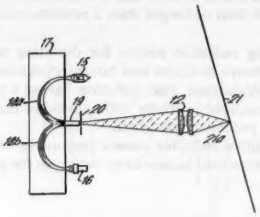
Filed Jan. 29, 1974, Ser. No. 437,691
Claims priority, application United Kingdom, Jan. 30, 1973, 4505/73
Int. Cl.² G02B *5/14*; **G06K** *7/10*
U.S. Cl. 250—227 **22 Claims**

1. In a document reading head of the single reading point type comprising a support having first, second and third apertures therein, and an optical system, a lamp, and a photodetector respectively accommodated in said apertures, the improvement comprising:

two fibre optic bundles, one transmitting light from the lamp to the optical system and one transmitting light from the optical system to the photodetector,

a block in which the two fibre optic bundles are encapsulated, said bundles having a Y-junction within said block whereby the said two bundles have a common termination at one point on the surface of the block and respective individual terminations at second and third points on the surface of the block, and

means mounting the block on the support in a position in which said first, second and third apertures are in optical



alignment with said first, second and third terminations respectively.

3,904,874

X-RAY DIAGNOSING DEVICE WITH MEANS FOR CHANGING X-RAY TUBE VOLTAGE

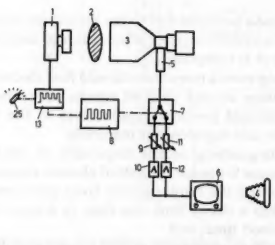
Heribert Amtmann, and Manfred Haltrich, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 11, 1974, Ser. No. 432,672

Claims priority, application Germany, Jan. 30, 1973, 2304427

Int. Cl. G01n *23/00*

U.S. Cl. 250—314 **6 Claims**



1. An X-ray diagnosing device having an X-ray tube, a fluorescent screen and a film camera for producing X-ray photographs, step-wise voltage-varying means varying the voltage of said tube during fluoroscopy or photography, means for superposing at least one soft ray image and one hard ray image, and dosage setting means for manually setting the dose for each of said images.

3,904,875

SINGLE RADIATION RAY PATH FOR THERMOGRAPHIC IMAGING AND TRANSFIXING OR FUSING

James D. Rees, Pittsford, and James A. Critchlow, Macedon, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 27, 1973, Ser. No. 428,957

Int. Cl. G01n *21/26*

U.S. Cl. 250—317 **28 Claims**

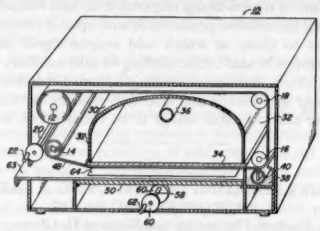
1. An image copying method comprising the steps of:

exposing a heat sensitive member having a delayed tack adhesive coating at a first station to an image-like pattern of thermal radiation from a radiant source, thereby thermally imparting said image to said member.

moving the imaged member in one direction to a development station,

developing said image at said development station,

moving the member with the developed image in the opposite direction back into said first station, and



re-exposing said member to thermal radiation from said source to fix said image.

3,904,876

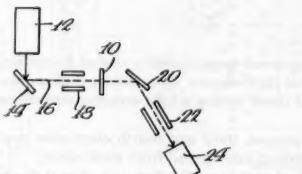
DETERMINATION OF PAPER ASH CONTENT BY X-RAY ABSORPTION ANALYSIS

Frank P. Arendt, Wisconsin Rapids, Wis., assignor to Consolidated Papers, Inc., Wisconsin Rapids, Wis.

Filed Sept. 20, 1974, Ser. No. 507,945

Int. Cl.² G01N *23/20*

U.S. Cl. 250—273 **5 Claims**



1. A method for quantitatively determining the constituents of paper containing cellulose, clay, and from nil to a significant amount of other elements having an atomic number greater than 16, comprising the steps of determining the amount of said other elements by x-ray absorption-edge analysis, measuring the total mass per unit area of the paper, and determining the amount of clay based on (1) the absorption by the paper of monochromatic x-rays having an energy greater than about 2.6 kev., (2) the previously determined amount of said other elements, and (3), the total mass per unit area of the paper.

3,904,877

IMAGED SHEET OR FILM AND METHOD AND APPARATUS FOR PREPARING SAME

Takanori Hasegawa, and Yoshio Tsuji, both of Tokyo, Japan, assignors to Asahi-Dow Limited and Riso Kagaku Corporation, both of Tokyo, Japan

Filed Dec. 12, 1972, Ser. No. 314,477

Claims priority, application Japan, Dec. 28, 1971, 46-2218; Apr. 20, 1972, 47-39922; Apr. 20, 1972, 47-47046[U]

Int. Cl.² G03C *5/16*

U.S. Cl. 250—317 **12 Claims**

1. A method of preparing an imaged sheet or film for projection, comprising

superposing an image-bearing original upon a stretched thermoplastic resin film or sheet, said original image comprising a substance which absorbs light of a wavelength of from 0.7 to 1.5 microns and which releases heat of absorption at said wavelengths, and

effecting flash irradiation of said resin film and said original with high intensity light having a high radiation intensity in the range of from 0.7 to 1.5 microns and a substantially lower radiation intensity outside of said range, said irradiation being effected for a time interval only of from about 10^{-4} to about 10^{-2} second,

whereupon said radiation is absorbed by said original image and absorbtive heat is generated thereat, and said absorptive heat, in turn, effects shrinkage of corresponding portions of said film which are opposed to said original image to form a concavo-convex image on said film.

3,904,878

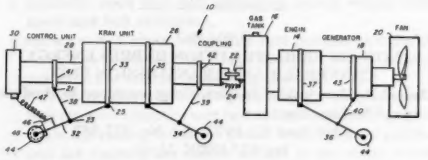
PIPELINE CRAWLER TYPE X-RAY MACHINE

Charles A. Burch, Tulsa, and Robert E. West, Catoosa, both of Okla., assignors to Xmas, Inc., Tulsa, Okla.

Continuation-in-part of Ser. No. 285,835, Sept. 1, 1972, abandoned, and a continuation-in-part of Ser. No. 285,726, Sept. 1, 1972, abandoned. This application Feb. 15, 1974, Ser. No. 443,005

Int. Cl. G01t *1/16*

U.S. Cl. 250—321 **18 Claims**



1. An inside-pipe crawler type x-ray machine, adapted for operation at all angles of rotation about its longitudinal axis, comprising:

a. a gasoline engine including a gasoline tank, wherein said gasoline tank is cylindrical and coaxial with said crawler and said pipe, and including a pendulous intake pipe swiveled at the axis of said tank, whereby as the crawler rotates about its longitudinal axis, the bottom of said intake pipe will always be dipped into the gasoline in the bottom of said tank;

b. an alternating current electrical generator driven by said engine;

c. an x-ray unit supplied with power from said generator;

d. a plurality of sets of hinged, spring-backed centralizing arms, and a plurality of motors connected to a plurality of driving wheels mounted respectively on one set of said centralizing arms;

e. a single gamma ray sensing means mounted on the longitudinal axis of said crawler; and

f. control means comprising:

1. a source of pulsed DC voltage comprising said electrical generator, a transformer and a rectifier;

2. means powered from said pulsed DC voltage to provide a high voltage DC first potential comprising current control means, step-up transformer means, rectifier means and filter means;

3. high energy radiation detector means powered by said first potential comprising geiger counter means;

4. first relay means responsive to said radiation detector means;

5. second relay means responsive to said first relay means to operate a ratchet driven switch means;

6. third relay means including circuit reversing means responsive to said ratchet driven switch means for controlling the power to said motor means;

7. said ratchet switch means including a first set of spaced contacts, and a second set of spaced contacts interleaved between said first set, so that a progressive movement of a contact arm sequentially contacts each of said two sets, said third relay means controlled by both sets of contacts, said circuit reversing means controlled by only one of said sets of contacts.

3,904,879

PHOTOVOLTAIC INFRA-RED DETECTOR

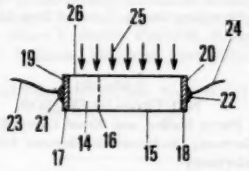
Daniel Amingual, Nogent-sur-Marne; Thuoc Nguyen Duy, Ivry-sur-Seine, and Yves Riant, Maisons-Alfort, all of France, assignors to Societe Anonyme de Telecommunications, Paris, France

Filed Apr. 8, 1974, Ser. No. 458,539

Claims priority, application France, Apr. 12, 1973, 73.13218

Int. Cl.² G01J *1/00*

U.S. Cl. 250—338 **6 Claims**



1. A photovoltaic detector of infra-red radiation having a wavelength of 9–15 μ, comprising a semiconductor material having an *n*-type region and a *p*-type region separated by a junction plane, the sensitive surface of the detector being perpendicular to said junction plane and the area of said sensitive surface exceeding the area of said junction plane, resulting in a high inverse impedance of the detector.

3,904,880

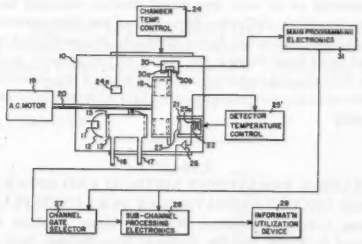
MULTI-COMPONENT INFRARED ANALYZER

Donald E. Benz, Young America; James H. Garfunkel, Mound, and Arlon D. Kompelien, Minneapolis, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed May 10, 1973, Ser. No. 359,144

Int. Cl.² G01N *21/26*

U.S. Cl. 250—343 **46 Claims**



1. A multi-component gas analysis apparatus for a selective analysis for one or more gases of interest in a gaseous mixture wherein each of said gases of interest has a characteristic infrared absorption spectrum associated therewith, said apparatus comprising:

a source of infrared radiation;

a first filter system for an analysis for a first gas of interest in said gaseous mixture, said first filter system having first and second filtering means:

said first filtering means having first and second filter elements aligned to receive said infrared radiation from said source during a first time duration, said first filter element being a filter cell means containing said first gas of interest at substantially constant pressure and said second filter element being a bandpass filter having a narrow passband which contains at least in part a

strong absorption line of said first gas of interest, and said second filtering means having a third filter element to receive said infrared radiation from said source during a second time duration, said third filter element being a bandpass filter having substantially said passband of said seond filter element;

detector means to receive said infrared radiation passed through both said gaseous mixture and said first filter system to provide a response in an output signal, said detector means being capable of an output signal response to received radiation in less than said first time duration and in less than said second time duration;

signal processing means to obtain from said output signal a first apparatus output indicating an analysis result as to said first gas of interest; and

synchronization means for synchronizing operation of said signal processing means to said first and second time durations.

3,904,881

NEUTRON DETECTOR

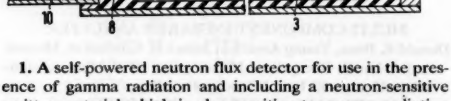
Erich Klar; Pierre Haller, and Ernst Georg Runge, all of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 7, 1973, Ser. No. 386,439

Claims priority, application Germany, Aug. 9, 1972, 2239226

Int. Cl. G01t *3/00*

U.S. Cl. 250—390 **10 Claims**



1. A self-powered neutron flux detector for use in the presence of gamma radiation and including a neutron-sensitive emitter material which is also sensitive to gamma radiation and which is surrounded by a collector with electrical insulating material between the emitter material and collector; wherein the improvement comprises the addition to said emitter material of at least one other emitter material having a gamma sensitivity differing from that of the first-named material, said two materials being mutually proportioned and arranged to at least reduce the effect of the gamma sensitivity of the first-named material on the output of the detector, and electric circuit connections connecting with said collector and materials.

3,904,882

RADIATION TREATMENT METHOD AND APPARATUS FOR DECONTAMINATION OF POLLUTED FLUID

Norman Lund, Melbourne; Karol J. Bialy, Merritt Island; Leland A. Mann, and Dr. David D. Woodbridge, both of Eau Gallie, all of Fla., assignors to Energy Systems, Inc., New York, N.Y.

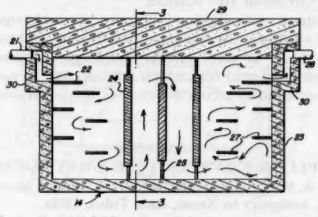
Continuation of Ser. No. 690,475, Dec. 14, 1967, abandoned. This application May 11, 1970, Ser. No. 37,398

Int. Cl.² G01N *21/26*

U.S. Cl. 250—437 **3 Claims**

1. A radiation chamber for use in a liquid waste effluent treatment system comprising in combination:

radiation shielding chamber means having two ends and a removable gamma radiation shielding cover, said chamber being adapted to prevent the passage of gamma radiation from said container; said chamber means having an inlet in one end and an outlet in the other end thereof adapted to prevent the exit of gamma radiation from said chamber; inlet baffle means adapted to increase the turbulence and to direct effluent toward a gamma radiation source; a plurality of parallel spaced gamma radiation sources adapted for said effluent to pass between and to provide substantially uniform radiation fields therebetween; outlet baffle means for baffling said effluent passing through said gamma radiation sources for directing said effluent toward a gamma radiation source, whereby effluent passing through said chamber will be substantially uniformly irradiated.



3,904,883

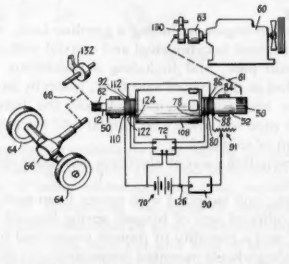
LOW OR ZERO POLLUTION HYBRID ENERGY CONVERTER AND TRANSMISSION UNIT

Elwood R. Horwinski, Cheshire, Conn., assignor to Products, Inc., Cheshire, Conn.

Filed June 22, 1973, Ser. No. 372,857

Int. Cl.² H02K *23/60*

U.S. Cl. 290—50 **9 Claims**



1. A power-converting hybrid unit comprising, in combination:

a. a rotary electric armature structure having core iron, and having commutator segments connected to coils so as to produce opposite poles at circumferentially spaced locations on the armature-structure iron when a pair of spaced-apart commutator segments is electrically energized,

b. a plurality of pairs of commutator brushes engaging the commutator segments,

c. field structure in which the armature structure rotates, said field structure having pairs of opposite poles respectively with a shunt generator field winding and a series motor field winding thereon,

d. means mounting the field structure for rotation independently of the armature structure and about the axis thereof,

e. sets of slip rings carried by the field structure, said commutator brushes and said field windings being connected respectively to individual rings of said sets,

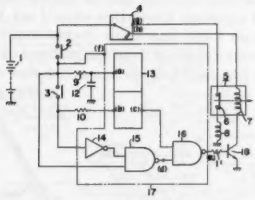
f. slip-ring brushes engaged with said slip rings, and

g. means including slip rings of said sets, connecting the series motor field winding with one commutator brush to provide a series motor circuit.

3,904,884
SEAT BELT OPERATION DETECTOR

Kousaku Uota, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 29, 1973, Ser. No. 410,500
Claims priority, application Japan, Nov. 9, 1972, 47-112354
Int. Cl. B60r 21/10
U.S. Cl. 307—10 S B 5 Claims

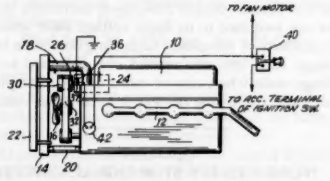


1. A vehicle seat belt operation detector comprising:
a normally open seating detection switch which closes upon seat occupancy,
a normally open seat belt utilization switch which closes upon seat belt utilization,
a starter switch which when in a first position permits the vehicle to be started and which when in a second position prevents the vehicle from being started,
a processing circuit for causing the starter switch to be in its first position when the seat belt utilization switch is closed while the seating detection switch is in its closed position and for causing the starter switch to be in its second position if the seat belt utilization switch is closed prior to the closing of the seating detection switch,
means connecting the seating detection switch to a power source,
means connecting the seat belt utilization switch to the power source through the seating detection switch,
means connecting the processing circuit to the power source through the seating detection switch
whereby the power source is not drained when the seating detection switch is in its normally open position and
whereby the vehicle cannot be started unless the seat belt utilization switch is closed while the seating detection switch is in its closed position.

3,904,885
MOTOR VEHICLE AIR CONDITIONER CONTROL SYSTEM

Jesse R. Hollins, 40 Stoner Ave., Great Neck, N.Y. 11021

Filed Dec. 3, 1973, Ser. No. 421,403
Int. Cl.² F25B 27/00; F01P 5/14
U.S. Cl. 307—10 R 1 Claim

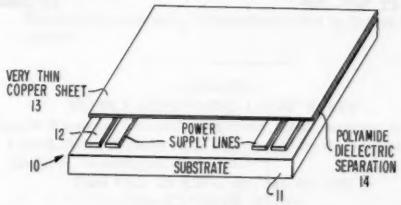


1. A motor vehicle air conditioner control system comprising a liquid cooled internal combustion engine, said liquid cooled internal combustion engine including a cooling system in which a liquid medium is used to cool the internal combustion engine, a motor vehicle air conditioning system, an air conditioner control electric switch, a thermal sensing means connected to said air conditioner control electrical switch, said thermal sensing means being a heat sensitive switch that is immersed in said liquid, said heat sensitive switch having two states, said heat sensitive switch being in the first state when the temperature of the cooling liquid is below a predetermined value and in the second state when the temperature of the cooling liquid is above the predetermined value, said motor vehicle air conditioning system including a compressor, an electrically controlled clutch for driving said compressor and electrically connected to said heat sensitive switch, and said clutch being closed when said heat sensitive switch is in the first state and open when said heat sensitive switch is in the second state.

3,904,886
VOLTAGE DISTRIBUTION SYSTEMS FOR INTEGRATED CIRCUITS

Theodore P. Ehling, Chester, N.J.; Alexander Plaza, Colchester, Vt., and Albert E. Ruehli, Peekskill, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 1, 1974, Ser. No. 438,837
Int. Cl.² H04B 3/28
U.S. Cl. 307—89 9 Claims

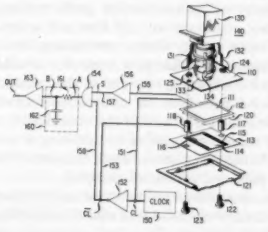


1. A method of damping unwanted power system transient oscillations due to the switching of high speed and high frequency integrated circuits in an integrated circuit package comprising the step of providing a non-ferromagnetic, conductive layer forming a closed loop in close proximity to the wire loops in the power distribution system.

3,904,887
SNAP-ACTION PUSHBUTTON SWITCH

David William Hagelbarger, Morristown, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 25, 1974, Ser. No. 454,073
Int. Cl.² H01H 9/54
U.S. Cl. 307—139 15 Claims



11. A pushbutton switch comprised of
first, second, and third signal leads,
means for capacitively coupling signals from said first lead to said second lead, said coupling means having a predetermined impedance to said signals,
movable, conductive, magnetic means supported adjacent to said coupling means and connected to said third signal lead, and

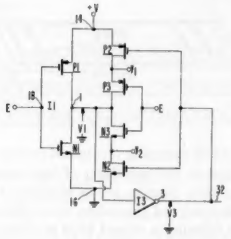
manually controllable means for magnetically moving at least a portion of said magnetic means sufficiently closer to said coupling means so that the impedance between said second and third leads is much less than the impedance between said first and second leads.

3,904,888

CIRCUITS EXHIBITING HYSTERESIS USING TRANSISTORS OF COMPLEMENTARY CONDUCTIVITY TYPE

Roger Thomas Griffin, Flackwell, Great Britain, and Daniel Lee Hillman, High Bridge, N.J., assignors to RCA Corporation, New York, N.Y.

Filed July 5, 1974, Ser. No. 486,232
Claims priority, application United Kingdom, May 17, 1974, 22048/74
Int. Cl.[2] H03K *19/08, 19/40, 19/36, 3/795*
U.S. Cl. 307—205 **16 Claims**



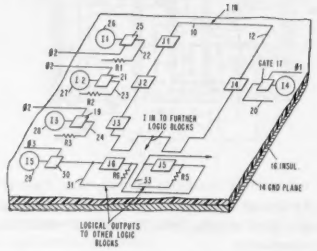
1. The combination comprising:
first and second terminals for the application therebetween of an operating potential;
an input point for the application thereto of an input signal and an output connection;
first and second transistors, each transistor having a conduction path and a control electrode for controlling the conductivity of its conduction path; means connecting the control electrodes of said first and second transistors to said input point; means connecting one end of the conduction path of said first transistor to said first terminal; means connecting one end of the conduction path of said second transistor to said second terminal; means connecting the other end of the conduction paths of said first and second transistors to said output connection;
third and fourth transistors, each transistor having a conduction path and a control electrode;
feedback means connected between said output connection and the control electrodes of said third and fourth transistors; and
coupling means responsive to one value of the signal applied at said input point for connecting the conduction path of said third transistor through a relatively low impedance path between said first terminal and said output connection and responsive to another value of the signal applied to said input point for connecting the conduction path of said fourth transistor through a relatively low impedance path between said output connection and said second terminal.

3,904,889

SUPERCONDUCTIVE LOGIC CIRCUIT UTILIZING JOSEPHSON TUNNELLING DEVICES

Harvey C. Hamel, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed June 29, 1973, Ser. No. 374,822
Int. Cl. H03k *3/38, 19/30, 19/34*
U.S. Cl. 307—212 **2 Claims**



1. An apparatus using Josephson tunnelling devices in a multi-phase time sequence comprising:
a superconducting circuit having a first and second parallel branch;
a first current source connected in parallel to said first and second branch for providing a first current therethrough;
a plurality of Josephson tunnelling devices connected in series in said first branch of said superconductive circuit each having first and second electrodes and a tunnel barrier therebetween across which Josephson current can tunnel, said first and second electrodes and said barrier of each Josephson tunnelling device being connected in series;
a single Josephson tunnelling device located in said second branch of said superconducting circuit;
a first control conductor located adjacent said single Josephson tunnelling device, electrical pulses in said first control conductor at phase one time producing magnetic fields which couple to said single Josephson tunnelling device causing the Josephson tunnelling device to switch to its finite voltage state thereby causing said first current to flow through said first branch of said circuit;
a plurality of second control conductors, one associated with each of said plurality of Josephson tunnelling devices, electrical pulses in said conductors at phase two time producing magnetic fields which couple to said adjacent one of said plurality of Josephson tunnelling devices causing it to switch to its finite voltage state thereby causing said first current to flow through said second branch of said circuit; and
a first and second output Josephson tunnelling device, the first one switched to its finite voltage state when none of the plurality of Josephson tunnelling devices is in its finite voltage state and the second one switched to its finite voltage state when one or more of said first plurality of Josephson tunnelling devices is in its finite voltage state.

3,904,890

WORK UTILITY STOP SIGNAL CIRCUIT

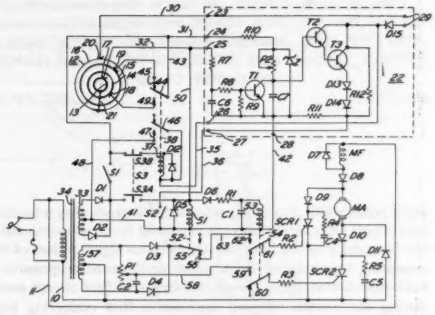
Carl M. Wenrich, Shillington, Pa., and Kalambur G. Ramachandran, Weehawken, N.J., assignors to Teledyne Mid-America Corporation, Los Angeles, Calif.

Filed Nov. 21, 1973, Ser. No. 417,876
Int. Cl. H03k *17/00*
U.S. Cl. 307—231 **12 Claims**

1. A stop signal device for detecting that a cyclically movable part of a work utility is about to stop or is to stop during the next cycle of movement, comprising in combination,

a. sensing means coupled to and synchronously movable with the cyclically movable part of the work utility, said sensing means having first means which generates a first sensing signal during a first portion of each cycle of movement of the work utility movable part and indicates a first particular position of the movable part of the work utility, which first sensing signal is indicative of the time duration of the said first portion of the cycle of movement,

b. a biased switch having an input circuit and an output circuit, the bias on said switch causing a first condition at said output circuit when said input circuit is in a first state, and said input circuit when in a second state overiding the switch bias and causing a second condition at said output circuit,



c. an event timer having an input circuit coupled to said sensing means to receive said first sensing signals and having an output circuit coupled to the said biased switch input circut, said event timer causing said biased switch input circuit to be in its said first state so long as said first sensing signal indicates a time duration less than a predetermined minimum time and causing said biased switch input circuit to be in its said second state when said first sensing signal indicates a time duration greater than the aforesaid predetermined minimum time,

whereby, the occurrence of said second condition at said biased switch output circuit signals that the cyclically movable part of the work utility is about to stop or will stop during the next cycle of movement.

3,904,891
LOGIC CIRCUIT FOR TRUE AND COMPLEMENT DIGITAL DATA TRANSFER

Robert M. O'Lear, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 25, 1971, Ser. No. 156,749
Int. Cl.[2] G06F *3/00, 7/00*
U.S. Cl. 307—238 **4 Claims**

1. A logic circuit for the transfer of digital data from a first storage device to a second storage device in the form of true and complement binary bits comprising:

an AND gate connected to receive an output from said first storage device in the form of a binary bit;

a source of enabling signals connected as a second input to said AND gate;

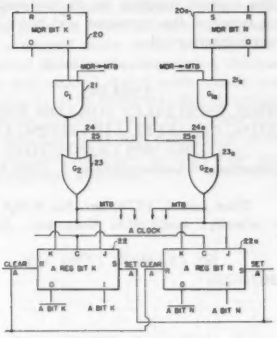
a J-K flip-flop connected in said second storage device to receive each binary bit of said digital data;

means connecting the output of said AND gate as J and K input signals to said J–K flip-flop;

a source of signals connected to clear said J–K flip-flop when desired;

a source of signal connected to set said J–K flip-flop when desired; and

a source of clock pulses connected to activate said J-K

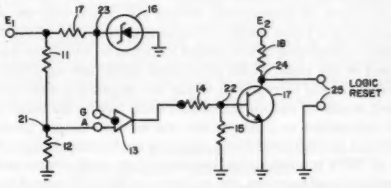


flip-flop for generating outputs responsive to its said input signals.

3,904,892
SUPPLY DEPENDENT LOGIC RESET

Donald Raymond Leonard, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 26, 1974, Ser. No. 454,985
Int. Cl.[2] H03K *17/60*
U.S. Cl. 307—252 F **1 Claim**



1. An electronic circuitry apparatus to detect a magnitude of voltage output supplied by a unidirectional power source when under initial load conditions and for supplying a signal output when the voltage reaches a predetermined level comprising;

reference voltage means including conduction means connected thereto for providing a fixed predetermined minimum voltage level from said unidirectional power source;

resistive voltage divider network coupled between said unidirectional power source and ground potential for providing a volt e level that remains a predetermined amount below said power source voltage level;

a programmable unijunction transistor device having an anode electrode electrically coupled to said resistive voltage divider, a cathode electrode and a gate electrode, said gate electrode electrically coupled to said reference voltage means;

resistive bias means electrically coupled to said cathode electrode for supplying a bias voltage level that is dependent upon the current flow through said conduction means; and

a transistor having a base electrode coupled to said resistive bias means, emitter electrode coupled to said ground potential and collector electrode coupled to a source of regulated voltage;

whereby said programmable unijunction transistor device goes into a conducting state when the voltage supplied by said resistive voltage divider network exceeds the fixed predetermined voltage of the reference voltage means and the current supplied by the unijunction transistor device turns on the transistor and holds it on until the current is interrupted.

3,904,893

AMPLIFIER, ESPECIALLY FOR LOW FREQUENCIES, UTILIZING PARALLEL AMPLIFYING CHANNELS WITHIN NPN TRANSISTORS

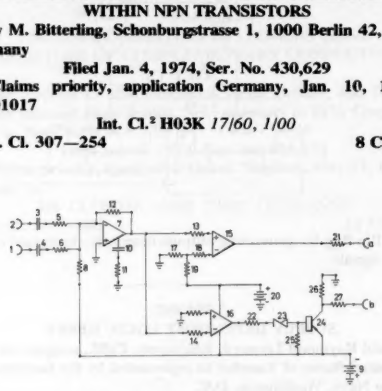
Kay M. Bitterling, Schonburgstrasse 1, 1000 Berlin 42, Germany

Filed Jan. 4, 1974, Ser. No. 430,629

Claims priority, application Germany, Jan. 10, 1973, 2301017

Int. Cl.² H03K *17/60, 1/00*

U.S. Cl. 307—254 **8 Claims**



1. In an amplifier, especially a low frequency amplifier; input circuit means having positive and negative pulses therewith and including complementary means to receive and mix an amplitude modulated signal and a sawtooth signal, means in the form of comparator means for converting the mixed signal into a pulse width modulated signal, said input circuit means comprising a first output terminal to which the positive pulses of the pulse width modulated signal are supplied and a second output terminal to which the negative pulses are supplied, a pair of output transistors each having the base terminal connected to a respective one of said output terminals, first and second amplifying channels each comprising a plurality of NPN transistors having the output ends connected to a common load terminal, the collector of the said output transistor which receives the negative pulses being connected to the base of the input transistor of said first channel, an auxiliary PNP transistor, the collector of the other of said output transistors being connected to the base of said PNP transistor, the collector of said PNP transistor being connected to the base of the input transistor of said second channel, and a source of auxiliary voltage connected between the emitter of said PNP transistor and the collector of the input transistor of said second channel, said NPN transistors having a high voltage tolerance and a medium switching time.

3,904,894

CIRCUIT FOR PRODUCING AN OUTPUT SIGNAL DURING THE PERIOD BETWEEN THE PULSES OF REPEATING TIME DISPLACED PULSE PAIRS

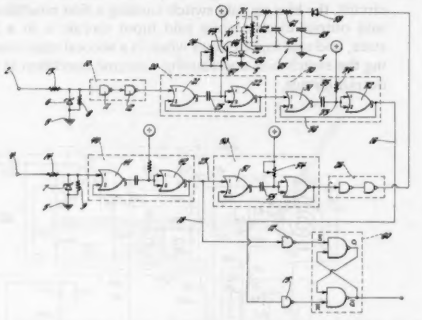
Henry J. Ciolli, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 24, 1974, Ser. No. 491,281

Int. Cl.² H03K *4/00, 3/10, 1/16*

U.S. Cl. 307—260 **8 Claims**

1. A circuit for producing an output signal during the period between repeating time displaced input signal pulse pairs comprising; first circuit means for producing a start output signal in response to each of the first occurring input signal pulses of said repeating input signal pulse pairs; second circuit means responsive to each of the later occurring input signal pulses of said repeating input signal pulse pairs for producing a stop output signal; output signal producing circuit means responsive to each of said start signals for initiating and to each of said stop signals for terminating the system direct current output signal; circuit means responsive to each of said stop signals for producing a series of constant pulse width output signal pulses; means responsive to said series of constant pulse width output signal pulses for producing a modulation signal of a direct current potential level proportional to the frequency of the later occurring input signal pulses of said repeating input signal pulse pairs; and means responsive to said modulation signal for disenabling said first circuit means during the period between successive first occurring input signal pulses of said repeating input signal pulse pairs.



3,904,895

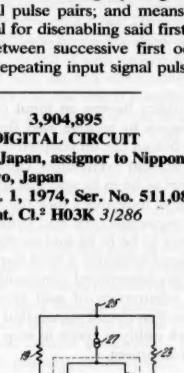
DIGITAL CIRCUIT

Yoshiki Higo, Tokyo, Japan, assignor to Nippon Electric Company Limited, Tokyo, Japan

Filed Oct. 1, 1974, Ser. No. 511,083

Int. Cl.² H03K *3/286*

U.S. Cl. 307—288 **7 Claims**



1. A digital circuit employing transistors operable in an unsaturated state comprising:

a pair of first transistors connected in a differential relationship with their emitters connected in common;

a pair of second transistors connected in a differential relationship with their emitters connected in common and with their collectors connected respectively to the bases of said first transistors, the collector of at least one of said first transistors being connected to the bases of the second transistors thereby forming a positive feedback loop between said pairs of transistors;

a first current source connected to the emitters of said first transistors;

a second current source connected to the emitters of said second transistors;

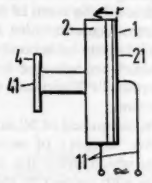
a first terminal for supplying a first constant voltage;
a first pair of resistors by which the first terminal is connected to the bases of the first transistors;
a second terminal for supplying a second constant voltage; and
a second pair of resistors by which the second terminal is connected to the bases of the second transistors;
whereby the state of the digital circuit is switched alternately in response to a control signal applied to the bases of one pair of transistors.

3,904,896

PIEZOELECTRIC OSCILLATOR SYSTEM

Max Guntersdorfer, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 158,472, June 30, 1971, abandoned. This application July 10, 1972, Ser. No. 269,935
Claims priority, application Germany, June 15, 1971, 2129664; June 30, 1970, 2032433; June 15, 1971, 2129718
Int. Cl. H01v *7/00*
U.S. Cl. 310—8.1 **12 Claims**



1. A piezoelectric oscillator system for amplitude transformation in response to energization by an AC voltage, comprising: a rectangular first plate to be stimulated into bending vibration; a mechanical vibration connecting member including at least a portion thereof having a low cross-sectional area and connected to said first plate; and a coupling oscillator connected to said connecting member for receiving an AC voltage and effecting vibration of said first plate, said coupling oscillator comprising a second plate connected to said mechanical connecting member and a piezoelectric transducer fastened to said second plate, said transducer and said second plate each including an electrode for receiving the AC voltage, wherein said plates are dimensioned to vibrate at the same bending oscillation-frequency and at amplitudes related to the inverse ratio of their masses, said piezoelectric transducer including a piezoelectric element carried on said first plate, said element and said first plate tuned for vibrations in the direction of an edge of said first plate, said element being polarized and including output electrodes for taking off a voltage produced thereby in response to bending vibration.

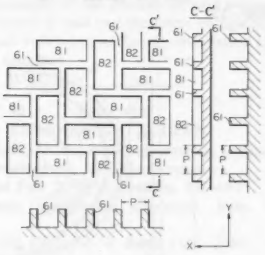
3,904,897

PULSE OPERATED SURFACE MOTOR STATOR

Hiromichi Shichida; Kiyoshi Tagami, and Kenichi Toyoda, all of Tokyo, Japan, assignors to Fujitsu Limited and Fujitsu Fanuc Limited, both of Tokyo, Japan

Filed Aug. 31, 1973, Ser. No. 393,630
Claims priority, application Japan, Sept. 8, 1972, 47-90081
Int. Cl.² H02K *41/00*
U.S. Cl. 310—12 **4 Claims**

1. A pulse operated surface motor comprising:
a stator having magnetic and non-magnetic materials arranged at predetermined intervals in first and second directions perpendicular to each other on a surface of the stator, the magnetic materials forming first stator teeth and second stator teeth, both acting as pole pieces, and being arranged in said first and second directions respectively;
a movable body, located above the surface of said stator which is able to move both in said first and second directions, said movable body including a first slider made of magnetic material having first slider teeth cooperating electromagnetically with said first stator teeth which causes said movable body to move along said second direction, a second slider made of magnetic material having second slider teeth, cooperating electromagnetically with said second stator teeth which causes said movable body to move along said first direction;
said stator having first and second rectangular shaped non-magnetic materials, said first rectangular shaped non-magnetic materials arranged so that their lengths are parallel to said first direction;



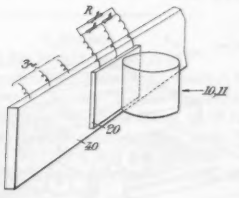
said second rectangular shaped non-magnetic materials arranged so that their lengths are parallel to the second direction and each of said first stator teeth being formed between adjacent pairs of first rectangular shaped non-magnetic materials and each of said second stator teeth being formed between adjacent pairs of second rectangular shaped non-magnetic materials, in the first direction each first rectangular shaped non-magnetic material overlapping the next first rectangular shaped non-magnetic material in the first direction, and in the second direction each second rectangular shaped non-magnetic material overlapping the next second rectangular shaped non-magnetic material in the second direction.

3,904,898

LINEAR ELECTRIC MOTORS

Alain Mailfert, Morsang-sur-Orge, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed Aug. 5, 1974, Ser. No. 495,095
Claims priority, application France, Aug. 10, 1973, 73.29388
Int. Cl.² H02K *41/02*
U.S. Cl. 310—12 **9 Claims**



1. In a linear electric motor comprising a stationary track having polyphase windings adapted to provide a sliding magnetic field when fed with polyphase AC currents from an external source, an assembly carried by a vehicle to be driven along said track and comprising:
a superconducting field winding located in a cryostat and adapted to provide a magnetic field synchronous with said sliding field,

auxiliary winding of conventional electrically conducting material substantially parallel to the track and connected to the vehicle for simultaneous movement along the track, located between said field winding and track, and means for circulating currents in said auxiliary windings.

3,904,899

LINEAR ASYNCHRONOUS ELECTRIC MOTORS

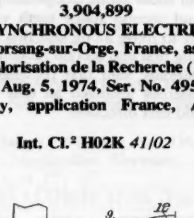
Alain Malfert, Morsang-sur-Orge, France, assignor to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed Aug. 5, 1974, Ser. No. 495,096

Claims priority, application France, Aug. 10, 1973, 73.29389

Int. Cl.² H02K *41/02*

U.S. Cl. 310—12 **5 Claims**



1. Linear asynchronous electric motor for use with a passive conductive track, comprising: a superconducting inductor winding adapted to be traversed by direct current, located in a cryostat and adapted to be mounted on a vehicle for rotation with the cryostat about an axis parallel to the plane of the track and perpendicular to the direction of relative movement of the vehicle with respect to the track; an auxiliary polyphase winding parallel to the track; and means for circulating in said auxiliary winding polyphase AC currents of such frequency as to create a moving field, synchronous with the field of the inductor, which winding is connected to the vehicle against relative motion parallel to the track between said auxiliary winding and the axis of the inductor.

3,904,900

PULSE OPERATED TWO-AXIS LINEAR MOTOR

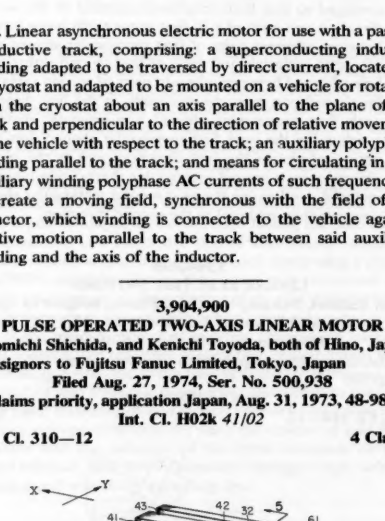
Hiromichi Shichida, and Kenichi Toyoda, both of Hino, Japan, assignors to Fujitsu Fanuc Limited, Tokyo, Japan

Filed Aug. 27, 1974, Ser. No. 500,938

Claims priority, application Japan, Aug. 31, 1973, 48-98009

Int. Cl. H02k *41/02*

U.S. Cl. 310—12 **4 Claims**



1. A pulse operated two-axis linear motor comprised of pulse operated linear motors including: a first member having a first surface;

a second member of which the bottom forms a second surface and the top forms a third surface, which can move in a first direction with respect to the first member keeping a small air gap between said first surface and said second surface;

a third member having a fourth surface, which can move in a second direction which crosses the first direction with respect to the second member keeping a small air gap between said third surface and said fourth surface;

wherein

the first surface is comprised of a plurality of first teeth made of magnetic material which are arranged in the first direction with a constant pitch "P", and each first tooth extends in the second direction; the second surface is comprised of N number (N is a predetermined positive integer) of first electromagnetic energizing units which drive the second member in the first direction with respect to the first member by electromagnetically cooperating with said first teeth wherein each first electromagnetic energizing unit has one pair of first electromagnetic elements comprised of first driving teeth which are surrounded by exciting coils and are arranged in the first direction with the constant pitch "P" and each of the first driving teeth extends in the second direction and further, each of the first driving teeth of one of the first electromagnetic energizing units is shifted by (1/N)P in relation to each of the first driving teeth of the adjacent members of the first electromagnetic units; the fourth surface is comprised of a plurality of second teeth made of magnetic material which are arranged in the second direction with a constant pitch "P", and each second tooth extends in the first direction;

the third surface is comprised of N′ number (N′ is a predetermined positive integer) of second electromagnetic energizing units which drive the third member in the second direction with respect to the second member by electromagnetically cooperating with said second teeth wherein each first electromagnetic energizing unit has one pair of second electromagnetic elements comprised of second driving teeth which are surrounded by exciting coils and are arranged in the second direction with the constant pitch "P" and each of the second driving teeth extends in the first direction and, further, each of the second driving teeth of one of the second electromagnetic energizing units is shifted by (1/N′)P′ in relation to each of the second driving teeth of the adjacent members of the second electromagnetic units;

wherein

one first electromagnetic energizing element of each of the first electromagnetic energizing units is arranged symmetrically, via a predetermined central point on the second surface, with respect to another first electromagnetic energizing element of said first electromagnetic energizing unit and one second electromagnetic energizing element of each of the second electromagnetic energizing units is arranged symmetrically, via a predetermined central point on the third surface, with respect to another second electromagnetic energizing element of said second electromagnetic energizing unit.

3,904,901

ROTARY ELECTRIC MACHINE WITH SUPER-CONDUCTING WINDING

Michael Claude Albert Renard, Grenoble, and Alain Malfert, Morsang-sur-Orge, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Nov. 2, 1973, Ser. No. 412,127

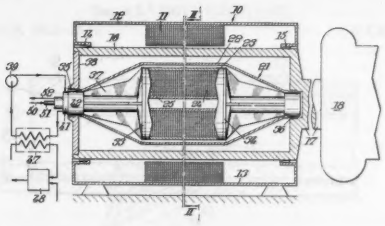
Claims priority, application France, Nov. 3, 1972, 72.38967; July 3, 1973, 73.24394

Int. Cl.² H02K *9/00*

U.S. Cl. 310—52 **25 Claims**

1. An asynchronous rotary electrical machine comprising, in combination: a stator having a normally conducting polyphase winding for providing a rotating field when electric

currents circulate therein; a superconducting field winding located in a cryostat enclosure and mounted for rotation within said stator in synchronism with the rotating field of said stator; and a mechanical torque transmission shaft, rotatable with respect to said stator and said field winding, which shaft is purely electromagnetically coupled to said field winding and includes an annular portion located between said field winding



and stator winding, said torque transmission shaft comprising a hollow cylinder of high mechanical resistance and low electric conductivity material internally lined with a high electrical conductivity material, said cylinder having internal longitudinal projections which hold the lining and said lining comprising a material selected from the group consisting of copper,, aluminum, aluminum base light alloys and zirconium base alloys.

3,904,902

SYNCHRONOUS MOTOR

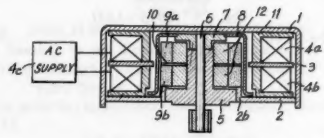
Tokuzo Inariba, No. 501, Nozawa Co-op., No. 21, Nozawa, 4-chome, Setagaya-ku, Tokyo-to, Japan

Filed Feb. 22, 1974, Ser. No. 444,874

Claims priority, application Japan, Feb. 26, 1973, 48-22214

Int. Cl. H02k *21/00*

U.S. Cl. 310—162 **8 Claims**



1. In a synchronous motor, a pair of circular permanent magnet means respectively having equal diameters and respectively surrounding a common axis while being situated adjacent each other respectively on opposite sides of a plane normal to said axis, each of said permanent magnet means having a series of N and S poles alternating with each other and circumferentially distributed about said axis and the number of N and S poles of one of said permanent magnet means equalling the number of N and S poles of the other of said permanent magnet means while being angularly offset with respect thereto to provide a predetermined out-of-phase relationship between the poles of said pair of permanent magnet means, a pair of circular coil means which have equal diameters respectively surrounding and spaced from said pair of permanent magnet means and also situated adjacent each other on opposite sides of said plane for respectively receiving alternating currents of the same frequency which have with respect to each other the same out-of-phase relationship as the poles of said pair of permanent magnet means, a circular magnetic plate situated in said plane between said pair of coil means for separating the latter from each other, said plate having an inner circumferential edge defining a circle whose center is in said axis and whose diameter is larger than the diameter of each of said permanent magnet means, said plate, said pair of coil means, and said pair of permanent magnet means all being stationary and forming part of a stator of the motor, a single rotor interacting with both permanent magnet means and both coil means, and support means supporting said rotor for rotary movement around said axis, said rotor having a cylindrical wall coaxially surrounding said axis and situated between said pair of permanent magent means, and said pair of coil means and plate, with said cylindrical wall of said rotor having an inner surface directed toward said pair of permanent magent means and an outer surface directed toward said pair of coil means and said plate therebetween, said cylindrical wall having a plurality of axially extending elongated cutouts circumferentially distributed about said axis and separated from each other by elongated portions of said cylindrical wall which extend substantially parallel to said axis, the number of poles of each of said permanent magnet means being an even multiple of the number of said elongated portions of said cylindrical wall and the latter elongated portions of said cylindrical wall being uniformly distributed circumferentially around said axis.

3,904,903

LUMINESCENT SCREEN

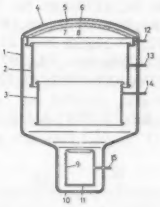
Wolfgang Schubert, Frauenaurach, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Feb. 7, 1973, Ser. No. 330,402

Claims priority, application Germany, Feb. 7, 1972, 2205681

Int. Cl. H01j *39/18;* **B44d** *1/02, 1/40*

U.S. Cl. 313—99 **3 Claims**



1. A luminescent screen comprising a vacuum case having a ray inlet window and an opposed end window, a cathode device located within said case opposite said inlet window and comprising superposed layers of a carrier of cesium iodite, a luminous layer of cesium iodite activated by sodium and a photo cathode layer of antimony-cesium, an anode located within said case adjacent to said end window, and cylindrical electrodes located between said cathode device and said anode, said anode having a luminescent screen facing said end window.

3,904,904

SEALED BEAM HEADLIGHT

Klaus Meinecke, Brand; Dieter Wilhelm, Eschweiler; Leo Coir, Brand; Jurgen Tillack, Aachen; Helmut Samulowitz, Verlautenheide, and Karl Gebhardt, Stolberg, all of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 22, 1974, Ser. No. 463,198

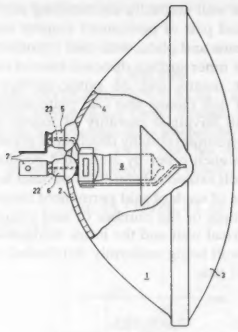
Claims priority, application Germany, Apr. 28, 1973, 2321709

Int. Cl.² H01K *1/26*

U.S. Cl. 313—113 **4 Claims**

1. An electric sealed beam lamp unit having an outer envelope which comprises a concave reflector part and a front glass and in which a filament lamp of high luminous intensity is disposed, said filament lamp having a pinch-shaped lamp cap, a lamp holder accommodating said lamp cap, said reflector part having sleeve shaped pinches, and a wire support secured to said sleeve shaped pinches, wherein said cap is

sleeve-shaped and made of metal strip material, said cap being disposed surrounding said pinch, said pinch having a substantially rectangular cross-section and said wire support being crank shaped and serving as the sole support for the lamp.



3,904,905

LUMINOUS RADIATION PANEL APPARATUS

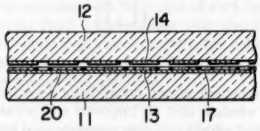
Masanori Watanabe, Osaka; Kinzo Nonomura, Kadoma, all of Japan, and Matsushita Electric Industrial Co., Inc., Osaka, Japan

Filed Feb. 26, 1973, Ser. No. 336,063

Claims priority, application Japan, Feb. 28, 1972, 47-20880; Feb. 29, 1972, 47-21352; Nov. 22, 1972, 47-117395; Nov. 22, 1972, 47-117396; Nov. 22, 1972, 47-117397; Dec. 28, 1972, 48-3366; Dec. 28, 1972, 48-3367; Dec. 28, 1972, 48-3368

Int. Cl. H01j *61/12*

U.S. Cl. 313—184 **9 Claims**



1. A luminous radiation panel apparatus of the type in which light is produced by a d.c. discharge through a space containing a gas between opposed substrates, each thereof having a plurality of anodes and cathodes disposed thereon so that said plurality of anodes disposed on one of said substrates are arranged to oppose and intersect said plurality of cathodes disposed on the other one of said substrates with said space interposed therebetween, wherein the pressure of the gas contained in said space is on the order of 760 mm Hg, and said plurality of anodes on one of said substrates are spaced away from said plurality of cathodes on the other one of said substrates so that the product of said pressure of said gas and the distance between said anodes and cathodes on said substrates determines an approximately minimum firing potential.

3,904,906

PLASMA DISPLAY PANEL INCLUDING AN OPAQUE, REINFORCING FILM

Mitsuoki Osawa, Akashi, and Toshinori Urade, Kobe, both of Japan, assignors to Fujitsu Ltd., Japan

Filed Dec. 20, 1972, Ser. No. 316,981

Claims priority, application Japan, Dec. 29, 1971, 46-75752

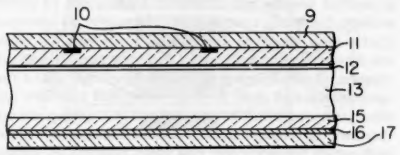
Int. Cl. H01j *61/35*

U.S. Cl. 313—188 **1 Claim**

1. A plasma display panel comprising;

a. a first and a second dielectric substrate, said first and second substrates being spaced from each other and sealed, a discharge gas contained within said sealed substrates forming a discharge gas space, at least one of said substrates being transparent;

b. first and second electrodes mounted on said first and second substrates, respectively;



c. a first and a second dielectric film covering said first and said second electrodes, respectively, said films facing said discharge gas space.

d. a surface reinforcing film only on the non-viewing side of one of said dielectric films, said reinforcing film being opaque and having a major component made from an oxide of a rare earth element selected from the group consisting of CeO_2 and La_2O_3.

3,904,907

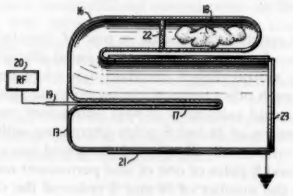
HELIUM RESONANCE LAMP AND A LEAK DETECTION SYSTEM USING THE LAMP

Robert A. Young, R.R. No. 2, Loretto, Ontario, Canada

Filed July 12, 1974, Ser. No. 488,184The portion of the term of this patent subsequent to Nov. 26, 1991, has been disclaimed.

Int. Cl.² H01J *11/00*

U.S. Cl. 313—201 **5 Claims**



1. A helium resonance lamp comprising

a hollow cylindrical body having a dielectric wall;

a reentrant coaxial hollow element integral within said body and extending from one end thereof substantially the length of said body;

an electrical conductor within said hollow element;

a hollow arm integral with and extending from said body;

a getter in said hollow arm for removing gases from said body;

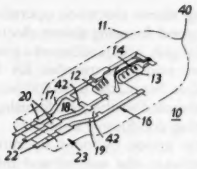
high purity helium within said body at a pressure between **0.1** and **100** torr and

a window partially transparent to the resonance radiation of said helium gas at the other end of said body.

3,904,908
MANUFACTURE OF ELECTRICAL DEVICES HAVING SEALED ENVELOPES

Kenneth Roy Wolfe, and Maurice George Clarke, both of London, England, assignors to Thorn Electrical Industries Limited, London, England

Filed Aug. 13, 1973, Ser. No. 387,595
Claims priority, application United Kingdom, Aug. 11, 1972, 37646/72
Int. Cl.² H01J 1/88, 19/42
U.S. Cl. 313—271 8 Claims

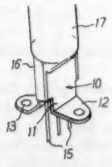


1. In the manufacture of an electric device having a sealed enclosing envelope, the steps of:
shaping a sheet metal blank to form a metal mounting member having a plurality of fingers interconnected with integral transverse metal bracing means,
attaching components of said device to said fingers,
inserting said mounting member with said components attached thereto into said envelope whereby said bracing means is located inside said envelope,
sealing said envelope, and
thereafter focussing a beam of radiation from a laser onto said bracing means to breach said means and isolate selected fingers mechanically and electrically from each other.

3,904,909
PINCH-SEALED ELECTRIC LAMPS

Arthur Samuel Vause, London, England, assignor to Thorn Electrical Industries Limited, London, England

Filed Nov. 1, 1973, Ser. No. 411,698
Claims priority, application United Kingdom, Nov. 9, 1972, 51819/72
Int. Cl. H01j 5/48, 5/50
U.S. Cl. 313—318 8 Claims

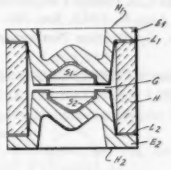


1. An electric lamp having internal components, said lamp comprising
an envelope with a pinch seal;
one or more shaped metal members secured to the external faces of the pinch seal, portions of the metal members being embedded within the material of the pinch seal by pressing said portions into said material in mechanical engagement therewith to hold the metal members in a predetermined position relative to the internal components of the lamp.

3,904,910
GAS-FILLED DISCHARGE OVERVOLTAGE PROTECTOR

Carl Arne Schleimann-Jensen, Danderyd, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

Filed Nov. 23, 1973, Ser. No. 418,611
Int. Cl.² H01J 17/00, 21/00
U.S. Cl. 313—325 4 Claims

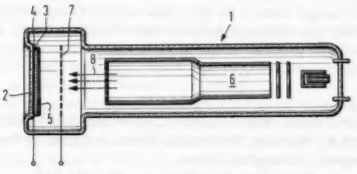


1. An overvoltage protector comprising at least first and second electrodes having faces disposed opposite each other across a gap, each of said electrodes being of a conductive material, the surface of at least a portion of the face of one of said electrodes being covered with a metal having properties such that the product of its thermal conductivity and boiling point is less than 1000 cal./cms. with an arcing voltage in vacuum of 5 to 15 volts, and a tubular envelope, each of said electrodes being vacuum-seal fixed into one end of said tubular envelope, respectively.

3,904,911
LIGHT-SENSITIVE TARGET FOR VIDICON PICTURE TUBE

Wolfgang Welsch, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation of Ser. No. 259,596, June 5, 1972, abandoned. This application Sept. 13, 1973, Ser. No. 396,795
Int. Cl.² H01J 29/45, 31/38
U.S. Cl. 313—366 4 Claims



1. A light-sensitive target for a vidicon picture recording tube, said target adapted to be scanned by an electron beam, said target comprising a transparent plate, a thin planar metal electrical conductive layer attached to said transparent plate and one side of which an incident optical image is applied, a photo conductive planar semiconductor attached to the other side of said thin metal layer to form a Schottky diode surface, said photo conductive planar semiconductor formed of material from Groups III-V and II-VI, said photo conductive planar semiconductor comprising a first layer of substantially intrinsic semiconductor material and said thin metal layer attached thereto, a second lightly p-doped layer formed in said planar semiconductor on the side away from said thin metal layer and said lightly p-doped layer scanned by said electron beam on a time sequential basis and the resistance of said photo conductive planar semiconductor having a value such that charges produced by said incident optical image will be present as said electron beam scans said target, said semiconductor and thin metal layer forming a large surface metal semiconductor contact with a surface area of approximately 1 cm^2, the barrier layer having a resistance to provide sufficient insulation corre-

sponding to a low dark current density of $j_D < 10^{-6}$A/cm², due to sufficient band bending.

3,904,912

CATHODE RAY TUBE DISPLAY SCREEN HAVING OVERLAPPING TRIAD ELEMENTS AND SEPARATED TRIADS

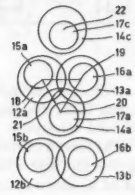
Jan Hendrik Duistermaat, Emmasingel, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 9, 1973, Ser. No. 387,151

Claims priority, application Netherlands, Aug. 26, 1972, 7211677

Int. Cl.² H01J 29/32, 31/20

U.S. Cl. 313—408 3 Claims



1. A cathode ray tube for displaying color pictures, comprising an electrode system for producing three electron beams, a shadow mask with a plurality of substantially circular apertures, a picture display screen provided on the window of the tube at a distance from the mask and including a plurality of triplets of substantially uniform circular surfaces of luminescent materials, each surface in a triplet luminescing in a different color upon excitation by an assigned electron beam passing through an associated aperture in said mask partially overlapping each other surface of said triplet, the distance between the mask and the area near the edge of the display screen being reduced and said triplets — at least in the area near the edge of the display screen — being separated from each other the average of the three distances between the centers of the luminescent surfaces and the center of gravity of the triangle formed by the three centers being smaller than one-third the distance between the centers of two nearest luminescent surfaces of the same color.

3,904,913

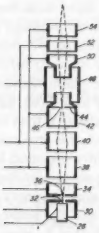
FOCUSING MEANS FOR CATHODE RAY TUBES

Gordon R. Spencer, Westwood, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Aug. 27, 1973, Ser. No. 391,916

Int. Cl.² H01J 29/02, 31/58

U.S. Cl. 313—449 2 Claims



1. An electron gun comprising:

an electron emitting cathode disposed adjacent one end of the gun for directing a beam of electrons toward an opposing output end of the gun;

a beam limiting anode cylinder operatively aligned with the cathode and having therein a transverse wall provided with a central aperture for permitting a limited electron beam therethrough;

a first focusing sleeve electrode operatively disposed in alignment between the cathode and the beam limiting anode for intermittently focusing an enhanced electron beam through the aperture;

a second focusing sleeve electrode operatively disposed between the beam limiting anode and the output end of the gun, and positioned a predetermined axial distance from said wall member for focusing said limited electron beam;

a third focusing sleeve electrode operatively disposed between the second focusing sleeve electrode and the output end of the gun, and positioned a predetermined axial distance from said wall member for focusing said enhanced electron beam, the third focusing electrode being electrically coupled to the first focusing electrode by an interconnecting conductive member;

an intermediate anode cylinder operatively disposed in alignment between the second and third focusing electrode; and

an output anode cylinder operatively aligned with the third focusing electrode and disposed adjacent the output end of the gun.

3,904,914

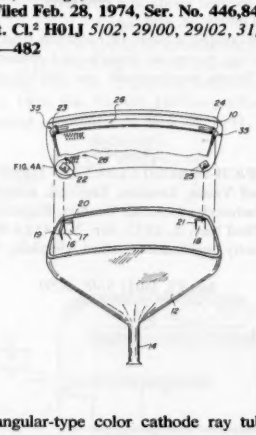
COLOR CATHODE RAY TUBE WITH INTERNAL FACEPLATE AND FUNNEL REFERENCE SURFACES FOR UNIQUE FACEPLATE-FUNNEL RELATIONSHIP

Kazimir Palac, Carpentersville, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Feb. 28, 1974, Ser. No. 446,845

Int. Cl.² H01J 5/02, 29/00, 29/02, 31/20

U.S. Cl. 313—482 9 Claims



1. A rectangular-type color cathode ray tube envelope, comprising:

an approximately rectangular, flangeless faceplate having an inner surface suitable for receiving a phosphor screen and having in at least two perimetric interior regions thereof discrete referencing means extending from said inner surface and constituting a part of said faceplate, said referencing means defining a set of faceplate reference surfaces within the envelope enclosure; and

a funnel having an approximately rectangular mouth sealed to said faceplate and having in at least two corresponding perimetric interior regions referencing means defining a corresponding set of inside funnel reference surfaces in alignment with said faceplate reference surfaces, said referencing means of said faceplate extending into the interior of said funnel to make referencing engagement with said set of funnel reference surfaces when said faceplate and funnel are assembled, the engagement of said faceplate and funnel reference surfaces uniquely deter-

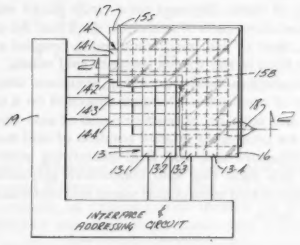
mining and fixing the location of said faceplate relative to said funnel.

3,904,915

GAS MIXTURE FOR GAS DISCHARGE DEVICE

David C. Hinson, Whitehouse, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Continuation-in-part of Ser. No. 279,875, Aug. 11, 1972. This application Nov. 5, 1973, Ser. No. 412,576
Int. Cl.[2] H01J 63/04; H05B 33/02
U.S. Cl. 313—484 11 Claims



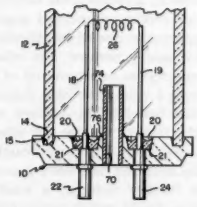
1. In a process for operating a multiple gas discharge device comprising a multiplicity of gas discharge cells, electrodes locating the cells, an ionizable gaseous medium at the cells, and at least one phosphor, with radiation from the gas discharge exciting the phosphor, the improvement which comprises decreasing the peak gas discharge currents by utilizing an ionizable gaseous medium consisting essentially of about 15 to 45 percent atoms of argon and about 85 to 55 percent atoms of a xenon-based composition, said xenon-based composition consisting essentially of about 95 to 100 percent atoms of xenon and about 5 to 0 percent atoms of another selected component.

3,904,916

END CAP STRUCTURES FOR FLUORESCENT LAMPS

Thomas J. Emidy, Morris Plains; Donald P. Northrop, Glen Rock; Luke Thorington, Berkeley Heights, and Andrew Henry Olsen, Jersey City, all of N.J., assignors to Duro-Test Corporation, North Bergen, N.J.

Division of Ser. No. 124,311, March 15, 1971, Pat. No. 3,749,167. This application June 15, 1973, Ser. No. 370,377
Int. Cl.[2] H01J 63/04
U.S. Cl. 313—493 18 Claims



1. A fluorescent lamp comprising a tube open at each end thereof and having a phosphor on the inner wall thereof, an end cap sealed to each end of the tube, each end cap formed with a pair of walls defining a groove into which an end of the tube fits to seal said tube to the end cap, each said end cap being of insulating material, electrical terminal means for connection of the lamp to a fixture attached directly to a respective end cap, a cathode carried by each said end cap within said tube, and means for electrically connecting a respective cathode to said terminal means of each said end cap.

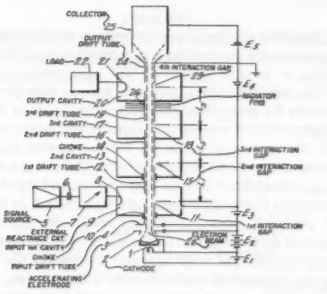
9. An end cap for a stemless fluorescent lamp comprising a base of insulating material, means forming a groove on said base into which an open end of a fluorescent lamp envelope is to fit and be sealed, and a pair of cathode mounting members fastened directly to said base and extending from one side thereof, and cathode means electrically connected between said cathode mounting members.

3,904,917

HIGH-EFFICIENCY BROADBAND KLYSTRON AMPLIFIER OF REDUCED LENGTH

Isao Ueda, Tokyo, Japan, assignor to Nippon Electric Company Limited, Tokyo, Japan

Filed May 14, 1974, Ser. No. 469,758
Int. Cl.[2] H01J 25/10
U.S. Cl. 315—5.39 17 Claims



1. A multi-cavity klystron having spaced apart electron beam generating means and beam collection means, said klystron having apparatus positioned between said beam generating and collection means comprising:

a front stage wide band exciting cavity group comprising a plurality of axially aligned spaced apart drift tubes for passing the electron beam therethrough and a plurality of cavities, each of said cavities spanning selected pairs of said axially aligned drift tubes;

at least one of said cavities having an external reactance circuit coupled thereto for enhancing wide band response of the klystron;

means for applying a voltage to a selected one of said drift tubes for accelerating an electron beam at least across the last drift tube interaction gap in said front stage wide band cavity group;

a rear stage bunching cavity group comprising at least one cavity spanning a selected pair of said drift tubes and being tuned to a frequency one to a few percent higher than the center frequency of the operating band;

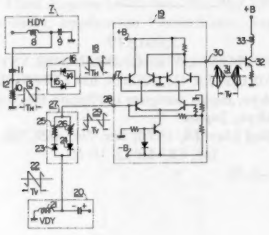
an output cavity spanning another selected pair of said drift tubes and being tuned substantially to the center frequency of said band and having an interaction gap for extracting energy from said electron beam;

choke means positioned between that one of the drift tubes forming the aforementioned interaction gap for accelerating the electron beam which is positioned closest to said beam generating means and the cavity associated therewith for isolating the drift tube closest to the beam generating means from said associated cavity to decouple D.C. components from the aforesaid drift tube.

3,904,918
DYNAMIC CONVERGENCE CORRECTION DEVICE

Shuzo Matsumoto, Yokohama, Japan, assignor to Hitachi, Ltd., Japan

Filed Aug. 14, 1973, Ser. No. 388,275
Claims priority, application Japan, Aug. 14, 1972, 47-80773
Int. Cl.² H01J 29/50
U.S. Cl. 315—13 C 7 Claims

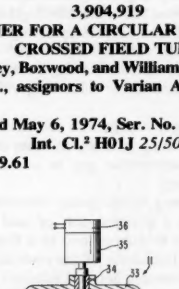


1. A dynamic convergence correction device comprising a first generator for generating a saw-tooth voltage for horizontal cycles, a second generator for generating a saw-tooth voltage for vertical cycles, first and second waveform correction circuits for respectively cutting off voltages in the respective predetermined ranges and passing the other voltages to convert the saw-tooth voltages for horizontal and vertical cycles into the respective waveforms each having a dead zone, a balanced modulator having first and second input terminals and an output terminal, means for connecting said first generator to said first input terminal of said balanced modulator through said first waveform correction circuit to supply to said first input terminal of said balanced modulator the saw-tooth voltage for horizontal cycles having a dead zone, means for connecting said second generator to said second input terminal of said balanced modulator through said second waveform correction circuit to supply to said second input terminal of said balanced modulator the saw-tooth voltage for vertical cycles having a dead zone, and means for drawing out from said output terminal of said balanced modulator an output in which the saw-tooth voltage for horizontal cycles having a dead zone is modulated by the saw-tooth voltage for vertical cycles having a dead zone.

3,904,919
ROTARY TUNER FOR A CIRCULAR ELECTRIC MODE CROSSED FIELD TUBE

George K. Farney, Boxwood, and William A. Gerard, Andover, both of Mass., assignors to Varian Associates, Palo Alto, Calif.

Filed May 6, 1974, Ser. No. 467,317
Int. Cl.² H01J 25/50
U.S. Cl. 315—39.61 9 Claims



1. A microwave tube comprising:

means for generating a stream of electrons;

microwave circuit means in energy exchanging relation with said stream of electrons for generating electromagnetic energy,

means for coupling said electromagnetic energy to a load;

cavity resonator means coupled to said circuit means for exciting in said cavity a resonance mode affecting the frequency of said electromagnetic energy;

tuner means within said cavity for cyclically varying the resonant frequency of said resonance mode, said tuner means comprising a conductive reactive loading structure, a conductive field perturbing structure, and an axis;

said conductive reactive loading structure comprising an array of vanes disposed on a circle about said axis and aligned along radii of said circle such that the electromagnetic field of said resonance mode couples electromagnetic field in the spaces between said vanes,

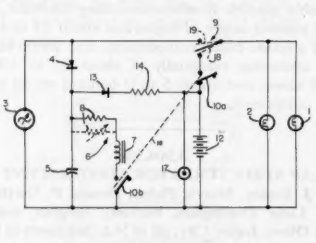
said conductive field perturbing structure comprising an array of conductive elements disposed on a circle about said axis adjacent at least one end of said vanes, and

means for producing relative rotation of said reactive loading structure and said field perturbing structure about said axis such that said conductive elements cyclically juxtapose said ends of said vanes and said spaces between said vanes.

3,904,920
SAFETY LIGHTING SYSTEM

Ronald A. Griffith, 1761 Kenilworth Dr., Clearwater, Fla. 33516

Filed Apr. 12, 1973, Ser. No. 350,574
Int. Cl.² B60Q 1/26
U.S. Cl. 315—78 3 Claims



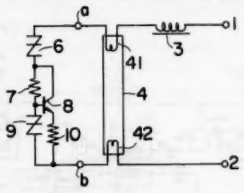
1. A wheeled vehicle lighting system, particularly for a bicycle, by which current is supplied to a lamp for the vehicle from both a generator and a battery, and by which simultaneous recharging of the battery is effected, said system comprising: an AC generator mounted to be driven by operation of said wheeled vehicle; a rechargeble battery; a vehicle lamp; two semiconductor diodes connected together and to one terminal of said generator, one of said diodes defining a rectification means for said generator, the other of said diodes being further connected to one terminal of said battery, said other diode defining a voltage sensing means responsive to a voltage differential between the voltage at the junction of said diodes and the battery voltage for effecting charging of the battery with current flowing therethrough from said generator only when the rectified half-wave generator output voltage exceeds the battery voltage; a multi-position switch means, one position of said switch means connecting said one terminal of said battery to said lamp, another position of said switch means disconnecting said battery and electrically coupling said one terminal of said generator to said lamp, charging of said battery being effected in both switch positions; and wherein the arrangement is such that battery current automatically flows through said lamp when said output voltage of said generator is less than said battery voltage, generator current automatically flowing through said lamp and the battery continuously charging when said output voltage of said generator exceeds the battery voltage.

3,904,921

STARTING DEVICE FOR DISCHARGE LAMP

Ichiro Imaizumi, and Minoru Nagata, both of Kodaira, Japan, assignors to Hitachi, Ltd., Japan

Filed Aug. 28, 1973, Ser. No. 392,303
Claims priority, application Japan, Aug. 28, 1972, 47-85362
Int. Cl.[2] H05B 39/02, 41/14
U.S. Cl. 315—101 26 Claims



1. A device for lighting a discharge lamp, said lamp having first and second filaments to which first and second pairs of filament terminals, at opposite ends thereof for initiating a discharge therein, are respectively connected, comprising:

first and second input terminals for coupling a source of AC voltage to respective ones of the filament terminals of said first and second pairs of filament terminals at the opposite ends of said lamp;

an inductive coil connected between said first input terminal and one of the filament terminals of said first pair;

a first switching circuit which controls the magnitude of the voltage between the other filament terminals of said first and second pairs of filament terminals:

a second switching circuit which controls the magnitude of the current which flows through said filaments and said first switching circuit when the first switching circuit is in the conductive state; and wherein

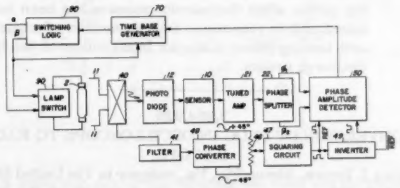
said first and second switching circuits are directly connected in series between the respective other filament terminals of said first and second pairs of filament terminals, so that a pulse is generated in said inductive coil.

3,904,922

LAMP CONTROL AND LAMP SWITCH CIRCUIT

Douglas E. Webb, Rochester, and Russell G. Schroeder, II, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 19, 1973, Ser. No. 416,921
Int. Cl.[2] H05B 37/02, 39/04, 41/36
U.S. Cl. 315—151 1 Claim



1. A lamp switch circuit for minimizing effects of cataphoresis in long multi-vapor arc lamps comprising:

a. a long multi-vapor arc lamp mounted for exposure;

b. silicon controlled rectifier bridge means connected across said lamp for establishing polarity of current flow through said lamp;

c. control circuit means for triggering said silicon controlled rectifier means on and off when cataphoresis effect causes said lamp light intensity to become imbalanced end-to-end, said silicon controlled rectifier bridge means comprises,

i. first and second pairs of silicon controlled rectifiers connected in a bridge configuration across said lamp, said first pair of silicon controlled rectifiers for establishing polarity of current flow through said lamp in a first direction when triggered by said control circuit means, said second pair of silicon controlled rectifiers for establishing polarity of current flow through said lamp in a second direction when triggered by said control circuit means;

ii. commutating means for preventing more than two silicon controlled rectifiers in said bridge from getting triggered on at the same time, said commutating means comprise first and second commutating compacitors, said first commutating compacitor wired between cathodes of said first pair of silicon controlled rectifiers, said second commutating compacitor wired between anodes of said second pair of silicon controlled rectifiers; and

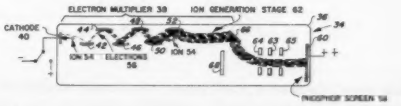
iii. current inhibiting means in series with said commutating means for preventing a rapid high current flow.

3,904,923

CATHODO-LUMINESCENT DISPLAY PANEL

James W. Schwartz, Glenview, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Jan. 14, 1974, Ser. No. 433,186
Int. Cl.[2] H01J 43/10, 43/30
U.S. Cl. 315—169 TV 11 Claims



1. A cathodo-luminescent device comprising:

wall means defining an enclosure containing an ionizable gas at a predetermined low pressure;

an electron-multiplier located within said enclosure for creating at an output end thereof a source of electrons, said electron-multiplier including cathode means and electron-multiplier anode means adapted to receive an applied potential different thereacross, said electron-multiplier generating positive gas ions as a result of collisions between electrons and the gas atoms, said electron-multiplier being constructed to provide a clear path for ions such that some of said ions feed back to said cathode to cause said cathode to emit electrons;

phosphor means disposed at one end of said enclosure in spaced relation to said output end of said electron-multiplier for emitting light when bombarded by high energy electrons;

accelerating anode means disposed at said phosphor means and adapted to receive a predetermined accelerating voltage substantially more positive than the voltage applied to said electron-multiplier means for drawing electrons from said electron-multiplier when said electron-multiplier is on and for accelerating them to high energies for impingement on said phosphor means, the said predetermined gas pressure being sufficiently low as to preclude the establishment of a gas discharge in said device; and

activating means for selectively causing the feedback loop gain of said electro-multiplier to be at least unity to drive said electron-multiplier to an on state associated with a predetermined high level of available electron-multiplier current and for selectively causing the feedback loop gain of said electron-multiplier to be less than unity to drive

said electron-multiplier to an off state associated with negligible electron-multiplier current.

3,904,924

ELECTROLUMINESCENT DISPLAY PANEL WITH SWITCHING VOLTAGE PULSE MEANS INCLUDING PHOTOSENSITIVE LATCHES

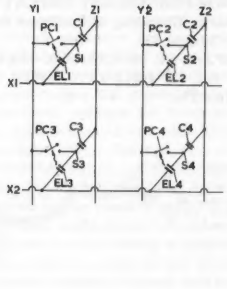
Cyril Hilsum, Malvern, and Adrian Leonard Mears, Leckhampton near Cheltenham, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Feb. 22, 1974, Ser. No. 445,288

Claims priority, application United Kingdom, Feb. 22, 1973, 8707/73

Int. Cl.² H05B *33/02, 37/00*

U.S. Cl. 315—169 TV **10 Claims**



1. An electroluminescent display panel including a first plurality of addressing conductors, a second plurality of addressing conductors forming a plurality of intersection regions with the first plurality of addressing conductors, each intersection region having associated with it a first electrical series combination of an electroluminescent element of phosphor material of the d.c. kind electrically connected to the member of the first plurality of addressing conductors forming the intersection region and a photosensitive latch electrically connected to the member of the second plurality of addressing conductors forming the intersection region, the first combination being arranged so that when light is emitted from the electroluminescent element it is incident on the latch, and each intersection region having associated with it a by-pass channel incorporating an electrical isolating capacitor connected to commonly to the electroluminescent element and the latch associated with that intersection to form a second series combination from said electroluminescent element and said capacitor, whereby a voltage pulse may be applied across the electroluminescent element without being applied across the latch, means for applying a switching voltage pulse across selected ones of said second series combinations in selected intersection regions to cause light emission from the electroluminescent elements thereof sufficient to cause the impedance of the latches in the first series combinations of said selected intersection regions to be reduced and means for applying across said first series combinations of said selected intersection regions of unidirectional energizing voltage capable of sustaining light emission of the electroluminscent elements in said selected intersection regions whilst said latches have a reduced impedance.

3,904,925

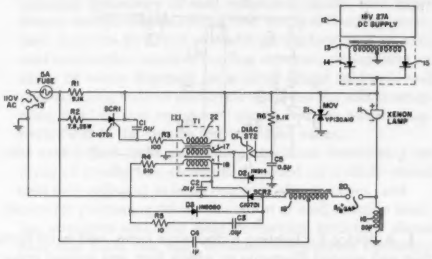
POWER SUPPLY FOR A THERMIONIC EMISSION GAS DISCHARGE LAMP

Samuel M. Korzekwa, Baldwinsville, and William Peil, Syracuse, both of N.Y., assignors to General Electric Company, Syracuse, N.Y.

Filed Oct. 1, 1973, Ser. No. 402,461

Int. Cl.² H05B *37/00*

U.S. Cl. 315—171 **10 Claims**



1. A power supply for a gas discharge lamp, stably operating in a thermionic emission mode, comprising:

a. an input source of a.c. line potentials,

b. a pair of output terminals of respectively positive and negative polarity required for connection to the anode and cathode of a gas discharge lamp,

c. a source of low voltage, high current d.c. potentials for sustained lamp operation, connected to one of said output terminals in said required polarity,

d. a starter connected to said a.c. source for energization and whose output is connected to said output terminals, said connections being maintained during starting and sustained operation, said starter comprising:

means connected to the other of said output terminals for generating a plural succession of high voltage trigger pulses for inducing a gas discharge in said discharge lamp,

means connected to said one output terminal for generating a corresponding plural succession of unidirectional medium voltage heating pulses in synchronism with said trigger pulses, said heating pulses being applied in said required polarity and occurring at a rate and in sufficient energy to heat the lamp gradually to thermionic emission temperature, and

interrogative control means coupled to said one output terminal for sensing the voltage drop across said lamp during starting and sustained operation, said control means being responsive to the lamp voltage drop to discontinue the generation of said triggering and heating pulses when thermionic emission has been established and to recontinue said generation of triggering and heating pulses when an interruption of the lamp discharge occurs.

3,904,926

CONVERSION OF PLUG-IN OSCILLOSCOPE TO RADAR B-SCOPE

Bruce J. Brown, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 17, 1972, Ser. No. 218,383

Int. Cl.² H01J *29/78*

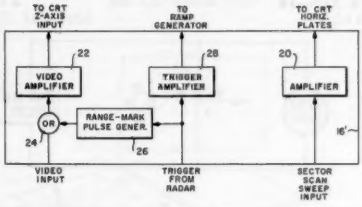
U.S. Cl. 315—378 **5 Claims**

1. The method of converting a dual-plug-in-type of oscilloscope to a device usable either as an oscilloscope or a radar B-Scope, said dual-plug-in-type of oscilloscope having a cathode ray tube (CRT) with a blanking electrode, an amplifier plug-in (P-I) unit for amplifying the input signal and applying it to the vertical deflection means of said CRT, a time-base-

generator plug-in (P-I) unit synchronized by an input trigger pulse, a first plug-in connector between the amplifier and CRT frames and a second plug-in connector between the time-base generator and CRT frames, said CRT, amplifier P-I unit and time-base-P-I unit being on individual frames, the output of the time-base generator being applied to the horizontal deflection means of said CRT, said method comprising the steps of:

replacing the CRT with one having a long-persistence screen;

interchanging said amplifier and time-base generator plug-in units;



adding a video amplifier to the frame of said amplifier P-I unit, said video amplifier being wired to receive the radar video output as an input signal;

including switching means for routing the blanking pulses from said time-base-generator P-I unit to said blanking electrode when said time-base generator unit is in either its original or its B-scope position; and

connecting an electrode of the CRT which is suitable for intensity modulation to receive the output of said video amplifier through said second connector.

3,904,927

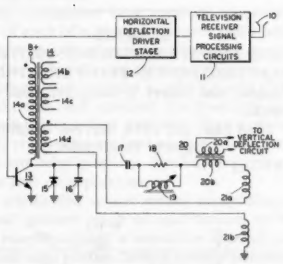
VOLTAGE REDUCTION CIRCUIT FOR DEFLECTION YOKE

Carl Franklin Wheatley, Jr., Somerset, and Oleksij Shevchenko, Somerville, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed June 8, 1973, Ser. No. 368,161

Int. Cl.[2] H01J *29/70*

U.S. Cl. 315—408 **6 Claims**



1. A deflection circuit for reducing the peak voltage developed across a deflection winding, comprising:

switching means operable from a first to a second state during each deflection cycle in response to control signals applied thereto;

a transformer coupled to said switching means and to a source of operating potential;

first and second deflection coils serially coupled to said switching means and said transformer and to a point of reference potential; and

a winding of said transformer serially coupled between said first and second serially coupled deflection coils, said winding poled such that the volatage developed thereacross as said switching means operates from said first to said second state is of the opposite polarity relative to the voltage developed across said deflection coils at the same time for reducing the peak voltage appearing across said deflection coils.

3,904,928

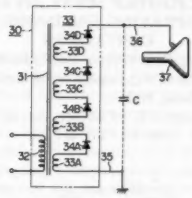
FLYBACK TRANSFORMER

Hiroji Sawada, Hitachi; Yasuhiro Mizuhara, Yokohama; Tokio Isogai, and Matao Nagai, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Oct. 10, 1973, Ser. No. 405,056

Int. Cl.[2] H01J *29/70*

U.S. Cl. 315—410 **15 Claims**



1. A flyback transformer comprising a magnetic core and primary and secondary windings wound around said magnetic core, said secondary winding including a plurality of winding units wound on a plurality of winding grooves of a bobbin and a plurality of rectifying elements of small capacity, the number of winding units in said plurality of winding units being equal to the number of rectifying elements in said plurality of rectifying elements, said winding units being connected only by said rectifying elements alternately in series, one terminal of said secondary winding being substantially grounded and the other terminal thereof being connected to a picture tube.

3,904,929

ELECTRO-DISCHARGING SHEET, AND AN ELECTRO-DISCHARGING APPARATUS PROVIDED WITH AN ELECTRO-DISCHARGING ELECTRODE COMPOSED OF THE SAID SHEET, AND A PROCESS FOR ELECTRO-DISCHARGING WITH THE SAID APPARATUS

Yoshinosuke Kanaya, Kiryu; Minoru Hasegawa, Ashikaga; Kanae Azuma, Ashikaga; Minoru Ochiai, Ashikaga, and Jun Shimizu, Ashikaga, all of Japan, assignors to Kohkoku Chemical Industry Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1973, Ser. No. 412,251

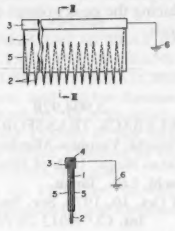
Claims priority, application Japan, Nov. 10, 1972, 47-112795; Nov. 22, 1972, 47-117486; Nov. 22, 1972, 47-117487; Aug. 11, 1973, 48-90256; Dec. 28, 1972, 48-2961; Feb. 19, 1973, 48-21345; Mar. 1, 1973, 48-26176; Mar. 9, 1973, 48-29514; Mar. 24, 1973, 48-35643; July 6, 1973, 48-80257

Int. Cl. H05f *3/00, 3/02*

U.S. Cl. 317—2 R **16 Claims**

1. An electro-discharging apparatus of a self-discharge type comprising a flexible electro-discharging electrode provided with a number of projecting portions and including a flexible sheet having a flexible base material and an electrically con-

ductive coating disposed thereon, said base material including woven, unwoven and knitted cloths and paper, said coating



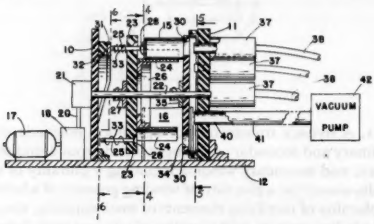
composed of a carbon black high molecular resin composition.

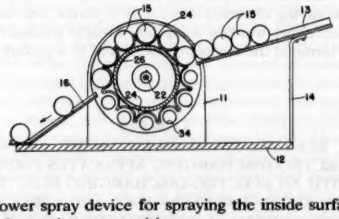
3,904,930

AUTOMATIC POWDER SPRAY APPARATUS AND METHOD FOR SPRAYING THE INSIDE SURFACES OF CONTAINERS

John W. Waldron, Fair Haven, and James E. Harvey, III, Little Silver, both of N.J., assignors to Estey Dynamics Corporation, Red Bank, N.J.

Filed Apr. 17, 1974, Ser. No. 461,481
Int. Cl.² B05B *5/00*
U.S. Cl. 317—3 **14 Claims**





1. A power spray device for spraying the inside surface of cylindrical containers comprising:

a. conveyor means for conveying an array of containers through a spray coating space, said conveyor means including a shielding face plate having a plurality of openings aligned with openings in the containers;

b. a series of grounded plungers disposed opposite each of said openings for resiliently pressing the containers against said face plate and for electrically grounding the containers; and

c. a spray gun positioned adjacent to the face plate for spraying fluent powder through said openings to coat the inside surface of the containers, said gun spraying electrically charged powder through a grounded conductive passageway before entering the containers.

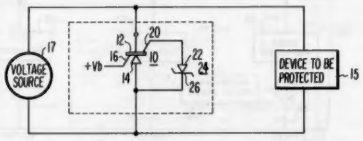
12. A method of automatically coating the interior surface of plurality of containers with fluent powder comprising: placing the containers on a conveyor means; electrically grounding the containers by connection to a grounded clamping means; spraying an ionized fluent powder into the container from a spray gun during the movement of said conveyor means; and removing the sprayed containers from the conveyor means.

3,904,931

OVERVOLTAGE PROTECTION CIRCUIT

Arthur John Leidich, Hunterdon, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 3, 1973, Ser. No. 385,301
Int. Cl.² H02H *3/20, 1/04*
U.S. Cl. 317—16 **2 Claims**



1. An alternating current overvoltage protection circuit, for protecting a load having two signal input terminals from a transient overvoltage component of a given polarity in excess of the normal peak amplitude of an alternating current signal supplied to said signal input terminals, comprising:

a reverse blocking tetrode thyristor having an anode terminal for connection to one of said load terminals and a cathode terminal for connection to the other of said load terminals, said thyristor also having a cathode gate terminal and an anode gate terminal;

a Zener diode connected at the anode and cathode terminals thereof, respectively, to the cathode gate terminal and the anode terminal of said thyristor; and

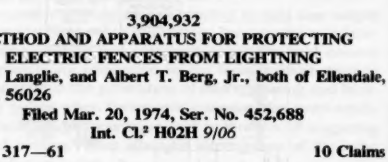
means for continuously applying a direct current reverse bias signal of said given polarity to said anode gate terminal, whereby said thyristor is normally non-conductive for either polarity of said alternating current signal, is triggered into a conductive state by current supplied through said Zener diode to said cathode gate terminal in response to said transient overvoltage component of said given polarity and is rapidly returned to a non-conductive state in response to said reverse bias signal upon termination of said transient and reversal of said alternating current signal.

3,904,932

METHOD AND APPARATUS FOR PROTECTING ELECTRIC FENCES FROM LIGHTNING

Howard Langlie, and Albert T. Berg, Jr., both of Ellendale, Minn. 56026

Filed Mar. 20, 1974, Ser. No. 452,688
Int. Cl.² H02H *9/06*
U.S. Cl. 317—61 **10 Claims**



1. A method of protecting an electric fence from lightning comprising the steps of placing an electric fence tester of the arc gap type on an electric fence wire so that no arc is drawn

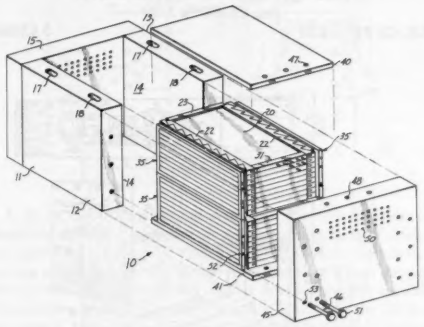
under normal operating conditions of the electric fence, and permitting said tester to remain in such relation so that the tester then functions as a lightning arrester should lightning strike the fence.

3,904,933

COOLING APPARATUS FOR ELECTRONIC MODULES

Ronald E. Davis, Chippewa Falls, Wis., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Oct. 23, 1974, Ser. No. 517,351
Int. Cl.² H05K 7/20
U.S. Cl. 317—100 10 Claims



1. An electronic circuit module comprising: a thermally conductive housing supporting a stack of a plurality of substantially planar circuit boards, said housing including side wall members defining internal surfaces;

fluid conduit means disposed in said wall members for containing coolant;

a thermally conductive edge member mounted to a side portion of each of said circuit boards, each edge member having a sawtooth edge portion defining a nominal edge plane of said board, said nominal edge plane being disposed substantially parallel to said internal surface of the respective side wall member, the sawtooth edge portion of each edge member including first surface portions disposed at a predetermined angle to said nominal plane and second edge portions forming transitions between adjacent first edge portions;

thermally conductive spacer means comprising a stack of individual spacers, each of said spacers having a first surface bearing against a respective internal surface and a sawtooth edge portion having surface portions disposed at a predetermined angle to said first surface, and frame means within said housing clamping said stack of spacers for fixedly positioning each of said spacers relative to the other spacers; and

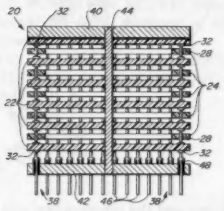
engaging means engaging said frame means to move said stack of spacers along said nominal plane thereby wedging each of said conductive spacers between said respective wall member and the respective conductive edge member of an individual circuit board of said stack of circuit boards, the surface portions of said sawtooth edge portions of said spacers bear against the first surface portions of the sawtooth edge portions of said edge members.

3,904,934

INTERCONNECTION OF PLANAR ELECTRONIC STRUCTURES

Jacob H. Martin, Wellesley, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Mar. 26, 1973, Ser. No. 344,846
Int. Cl. H02b 1/02; H05k 1/04
U.S. Cl. 317—101 D 4 Claims



1. An interconnection system for interconnecting a plurality of planar electronic circuit boards, each of the circuit boards including plurality of discrete contact portions for providing electrical coupling, said system comprising:

a support sheet disposed between and spaced from each pair of said planar electronic circuit boards;

a plurality of coupling elements slidably disposed in holes in each said support sheet and electrically insulated from the other said coupling elements on that support sheet, and aligned with said contact portions on the adjacent planar electronic circuit boards for providing direct electrical, mechanical and thermal coupling between said planar electronic circuit boards, each of said coupling elements having two ends extending substantially beyond said support sheet on opposite sides, each said end having a small cross-sectional area for increasing the contact pressure between it and a corresponding contact portion to provide a tight connection between said contact portion and said coupling element, and each of said coupling elements being sized to snugly fit and to move axially in said holes to independently adjust for deviations in said boards and sheets.

3,904,935

REMOVABLE STUDS FOR ELECTRIC POWER CONSUMPTION METERS

Robert O. Brewer, 4810 N. 28th Dr., Phoenix, Ariz. 85017, and Manuel A. Soto, 1219 E. Hess Ave., Phoenix, Ariz. 85034

Filed Aug. 26, 1974, Ser. No. 500,259
Int. Cl.² H02B 9/00
U.S. Cl. 317—107 7 Claims

1. A two element stud for use in conjunction with electrical power consumption meters and extending from the base of a meter, said stud interconnecting an electrical distribution line to an electrical junction box through the meter, said stud comprising:

a. a first T-shaped element having:

1. a base extending into the meter electrically and mechanically attached to the meter; and

2. a pair of opposed flange means extending from one edge of said first element base adjacent the meter base;

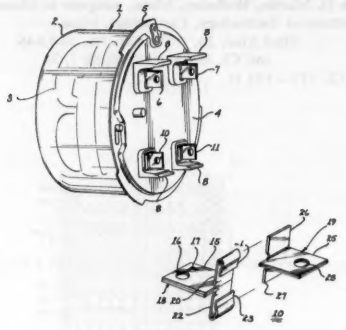
b. a second T-shaped element having:

1. a base, said second element base being electrically connectable to the junction box; and

2. a further pair of opposed flange means extending from one edge of said second element base; and

c. mating means slidably, electrically and mechanically connecting said pair of opposed flange means with said

further pair of flange means; whereby, the electrical continuity through the meter between the electrical distribution line and the junction box can be interrupted by slidably removing said second element.

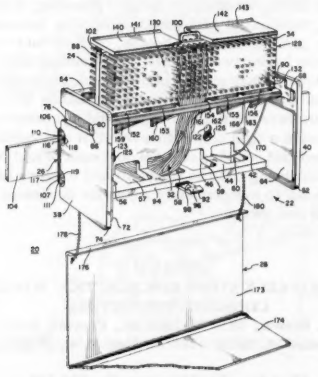


3,904,936

ROTATING TERMINAL BLOCK ASSEMBLY

Oliver Henry Hamrick, Jr., Wheeling; Joseph L. Zibilich, Chicago, and Casimir Cwirzen, Des Plaines, all of Ill., assignors to Cook Electric Company, Morton Grove, Ill.

Filed Mar. 14, 1974, Ser. No. 451,215
Int. Cl.[2] H02B *1/20*
U.S. Cl. 317—118 16 Claims



1. A rotating terminal block assembly coupling a plurality of first conductors to a plurality of second conductors, said assembly comprising:

a housing having a pair of side walls interconnected by a rear wall having first and second edge portions extending between said side walls and a ledge means extending from said rear wall adjacent said second edge portion,

a first set of exit windows through which said first conductors are extendable, said first set of exit windows are formed in said rear wall adjacent said first edge portion of said rear wall,

a second set of exit windows through which are extendable said second conductors, each window of said second set of exit windows is formed partially in said rear wall adjacent said second edge portion and partially in said ledge means,

a terminal block panel rotatably mounted between said side walls, said terminal block panel having first and second faces and first and second edges,

a plurality of terminals mounted on said terminal block panel, a first portion of each of said terminals extends out from said first face and is coupled to one of said plurality of first conductors and a second portion of each of said terminals extends out from said second face and is coupled to one of said plurality of second conductors,

first gate means through which said first conductors extend, said first gate means projects from said first edge of said terminal block panel and away from said first face, and

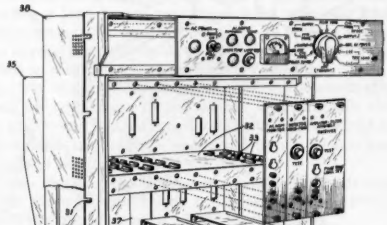
second gate means through which said second conductors extend, said second gate means projects from said first edge of said terminal panel and away from said second face.

3,904,937

CIRCUIT MODULE RACK AND CHASSIS ASSEMBLY

Herbert L. Levin, Wyckoff, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Apr. 12, 1974, Ser. No. 460,410
Int. Cl. H05k *5/00*
U.S. Cl. 317—120 3 Claims



1. An electric circuit module and chassis assembly for rack mounting in mobile communication carriers comprising in combination:

a chassis having front and back casings, the front casing comprises top, bottom and side members integrally structured to form a hollow frame including a plurality of horizontal cross-members integrally formed within and extending between said side members for providing support to at least one circuit module when mounted thereon, a front rectangular lip extending outward along the entire frame, a pair of side projections, one projection extending vertically along each of said side members, said pair of projections providing means for connecting the assenbly within the mobile carriers, and a rear rectangular lip extending along the entire frame to provide a surface for connecting an enclosure thereto, the back casing comprises top, bottom and side members integrally structured to form a hollow frame and complementarily arranged relative to said front casing;

a continuous rectangular enclosure member comprising top, bottom and side sections enclosing said front and back casings to provide a supporting enclosure for said front and back casings;

a plurality of shelves mounted within said enclosure member and interconnecting said front and back casings, each of said shelves containing at least one upwardly extending rail member for slidingly engaging at least one corresponding groove in at least one circuit module thereon; and

a plurality of circuit modules removably mounted upon said shelves, each of said modules comprising an integrally constructed U-shaped member wherein the sides of said U-shaped member constitute the sides of each module,

and the base of said U-shaped member constitutes the back section, each of said modules containing at least one electric circuit board removably attached therein, each of said modules having a groove which slidably engages with each of said rail members

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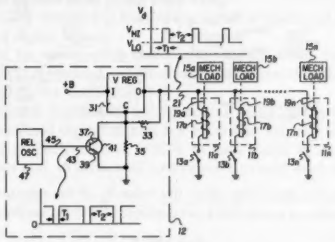
3,904,938
ELECTROMECHANICAL SYSTEM HAVING IMPROVED ELECTRICAL DRIVING MEANS

Kenneth G. Martin, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 15, 1974, Ser. No. 524,024
Int. Cl.[2] H01H *47/00*
U.S. Cl. 317—123 **6 Claims**

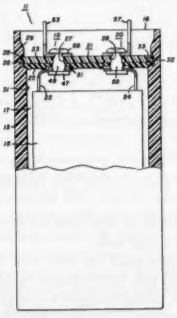


4. In an electromechanical system of the type wherein an electrical driving means drives an electromechanical device incorporating a hysteretic electromagnet, an improved device driving means comprising means for generating a time varying voltage which at substantially regular time intervals is capable of furnishing sufficient current to initially activate the device, and which, between occurrences of device-activating current capacity, is capable of furnishing less current yet enough to maintain the active state after initial activation.

3,904,939
CAPACITOR CASE SEAL AND VENTING MEANS

John W. Carino, Columbia, S.C., assignor to General Electric Company, Hudson Falls, N.Y.

Filed Feb. 11, 1974, Ser. No. 441,052
Int. Cl.[2] H01G *9/00*
U.S. Cl. 317—230 **5 Claims**



1. An electrical capacitor comprising:

a. a molded, thermoplastic cylindrical casing having an opening defined by an inner wall, said wall having means defining a circumferential channel in said inner wall whose depth along the longitudinal axis of said casing gradually varies over its circumference and becomes larger from a point of minimal thickness to a point of maximal thickness 180° from the point of minimal thickness

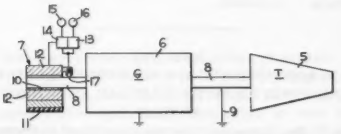
b. a capacitor section and electrolyte is said casing; and

c. a resilient disc seal, for hermetically sealing said open end, compressibly supported in said channel such that excess gas pressure will be vented by tipping the seal out of the channel at the shallowest point.

3,904,940
MEANS FOR DETECTING GROUND INSULATION FAILURE FOR ROTARY ELECTRIC MACHINES

Joe H. Burrus, Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Oct. 10, 1974, Ser. No. 513,876
Int. Cl.[2] G01R *31/12;* **G08B** *21/00*
U.S. Cl. 317—262 R **2 Claims**

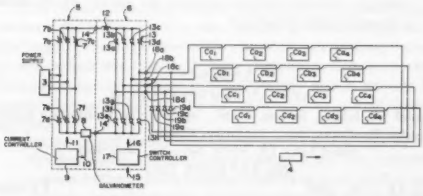


1. In combination with a dynamoelectric machine having an electrically grounded rotating shaft with electrical potential generated therein, a bearing rotatably supporting said shaft on a film of oil, said oil providing electrical insulation between said shaft and said bearing sufficient to cause a voltage potential across said oil film and electrical insulation isolating said bearing from electrical ground, a device for detecting electrical potential from said bearing to said ground comprising a voltage sensing means connected across said shaft and said bearing, said voltage sensing means indicating an increase in voltage when there is a condition exposing the unit to an increase in current flow from said bearing to said ground.

3,904,941
DRIVE POWER SUPPLY SYSTEM FOR THYRISTORIZED LINEAR MOTOR UTILIZING FEEDER SECTION SWITCHES CONTROLLED BY POSITION DETECTORS FOR CONTROLLING THE ENERGIZATION OF GROUND COILS

Kazumi Matsui, Tokyo, and Takashi Umemori, Musashino, both of Japan, assignors to Japanese National Railways, Japan

Filed May 31, 1973, Ser. No. 365,550
Claims priority, application Japan, May 31, 1972, 47-53417; May 31, 1972, 47-53418; May 31, 1972, 47-53419
Int. Cl. H02k *41/02*
U.S. Cl. 318—135 **9 Claims**



1. A transport means drive power supply control system wherein said transport means includes field coils said system comprising:

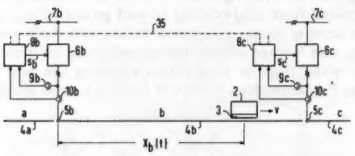
a. at least one dc constant current forward-reverse converter;

b. a first plurality of thyristor switch circuits corresponding to said dc constant current forward-reverse converters;
c. feeder means coupled to the output of said thyristor switch circuits;
d. a second plurality ground coil means, said ground coil means being geometrically integral but electrically sectioned wherein said first plurality is less than said second plurality;
e. position detector means located in proximity to said ground coil means for detecting the position of said transport means; and
f. feeder section switch means, coupled between said feeder means and said ground coil means, and controlled by said position detector means for controlling the energization of said ground coil means in a predetermined relationship to the position of said transport means whereby the magnetic fields of said ground coil means interacts with said field coils to provide a driving force to said transport means.

3,904,942
SYSTEM FOR OPERATING A SELF-PROPELLED TRACK BOUND VEHICLE WITH A LINEAR SYNCHRONOUS MOTOR

Joachim Holtz, Erlangen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Aug. 1, 1974, Ser. No. 493,895
Claims priority, application Germany, Aug. 17, 1973, 2341761
Int. Cl.² H02P *5/00*
U.S. Cl. 318—135 **25 Claims**



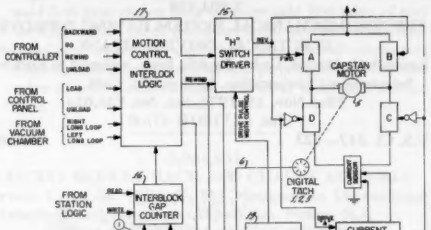
1. A circuit arrangement for the operation of a track-bound propulsion vehicle having a synchronous linear motor whose stator is installed along the roadbed as a traveling-field winding and whose exciter is arranged on the propulsion vehicle as a co-movable translator comprising:
a. a stationary static converter for supplying the stator of the synchronous linear motor with variable voltage and frequency;
b. means for timing the converter in dependence on the pole position of the translator; and
c. means for calculating pole position from the values of voltage, current, and frequency at the feeding point of the converter into the stator.

3,904,943
CAPSTAN SERVO SYSTEM

Daniel M. Klang, Irvine, Calif., assignor to California Computer Products, Inc., Anaheim, Calif.

Filed May 15, 1974, Ser. No. 469,960
Int. Cl.² G05B *5/01*
U.S. Cl. 318—395 **1 Claim**

1. In a capstan servo system of the type utilizing a digital tach mounted to the capstan motor shaft, the improvement which comprises:
means for generating pulses having a high amplitude;
means for generating pulses having a low amplitude;
means connecting said high amplitude means to the capstan motor so as to cause said capstan motor to accelerate;
means connecting said low amplitude means to the capstan motor so as to cause the capstan motor to run at a prescribed velocity;
means for decreasing the rise time of pulses generated by said high and low amplitude means so as to reduce the velocity variations of said capstan; and

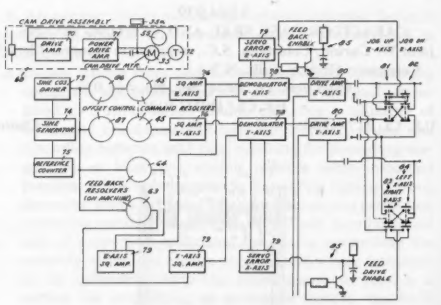


means for detecting when the velocity of the capstan motor reaches a prescribed percentage of the prescribed velocity;
means responsive to said detection means for switching from said high amplitude means to said low amplitude means.

3,904,944
MACHINE TOOL CONTROL

Warner W. Carrick, Sterling Heights, and Herbert E. Friedman, Lake Orion, both of Mich., assignors to The Babcock & Wilcox Company, New York, N.Y.

Filed Jan. 2, 1974, Ser. No. 429,862
Int. Cl.² G05B *19/36*
U.S. Cl. 318—578 **10 Claims**



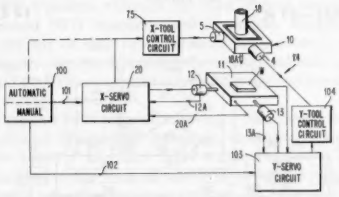
1. In a machine tool control, the combination comprising
a base,
a first slide mounted on said base for movement along a first axis relative to said base,
a second slide mounted on said first slide for movement along a second axis transverse to said first slide,
said second slide being adapted to support at least one tool,
drive means individual to each slide for moving said slide,
a work support on said base for supporting a workpiece with its axis parallel to said first axis of said first slide and transverse to said second axis of said second slide,
means for causing relative rotation between said work support and said slides about the axis of the workpiece,
a pair of rotary cams,
one of said rotary cams having a contour for controlling movement of said first slide along said first axis and the

other of said rotary cams having a contour for controlling movement of said second slide along said second axis,
means for supporting said cams for rotation about a single axis,
means for rotating said cams in synchronism,
a stylus for each said cam,
said stylus following said cam contour as said cam is rotated,
a rotary command resolver associated with each said stylus for producing an analog signal in response to movement of said stylus,
means for converting mechanical motion of each said stylus as it follows the cam contour of its respective cam into rotary motion of its respective command resolver,
a rotary feedback resolver associated with each said slide for producing an analog signal corresponding to the position of said slide along each axis,
means for converting the analog signal of each said resolver to a digital signal,
means for comparing said digital signals from each said rotary command resolver and its respective feedback resolver for each axis,
and means responsive to a predetermined differential between said digital signals for each said axis for actuating said respective drive means of said slides to move said slides and, in turn, said tool relative to said work support.

3,904,945
PRECISION TOOL AND WORKPIECE POSITIONING APPARATUS

Javathu K. Hassan, Hopewell Junction, and Carl V. Rabstejnek, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 10, 1973, Ser. No. 395,890
Int. Cl.² G05B *11/18*
U.S. Cl. 318—593 **21 Claims**

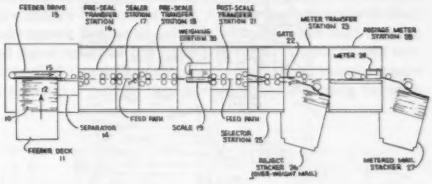


1. Apparatus for positioning first and second elements in a precise predetermined relationship one to the other, said apparatus comprising: positioning means for positioning said first element into a predetermined site, a control means having a signal output indicating the desired position of said first element relative to said second element from a fixed reference; position indicating means to provide a signal indication of the actual position of said element at any one time relative to said reference; comparing means having an output signal responsive to the difference between the signal output of said control means and the signal output of said position indicating means; and position drive means to drive said positioning means in response to said difference signal until said first element is within said predetermined site; and means for stopping said positioning means upon said difference signal reaching a predetermined value such as to indicate that said first element is within said site; second positioning means responsive to said difference signal for positioning said second element in a precise location relative to said first element.

3,904,946
FEED BACK CONTROL SYSTEM FOR A POSTAGE METER

Daniel F. Dlugos, Huntington; Gerald C. Freeman, Norwalk, and Flavio M. Manduley, Seymour, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed June 5, 1974, Ser. No. 476,680
Int. Cl.² G05B *19/40*
U.S. Cl. 318—685 **2 Claims**



1. A feed-back control system for setting an actuator assembly of a postage meter from a present meter setting to a subsequent meter setting, said feed-back system comprising:
a stepper motor operatively connected to said actuator assembly of said postage meter for rotationally setting the actuator assembly to a postage value position;
position determining means associated with said stepper motor for determining the rotational position of said stepper motor, and hence, a present postage value position set for said actuator assembly, said position determining means providing a discrete electrical output corresponding to the determined position of the stepper motor;
comparator means operatively connected to said output means for receiving the electrical output of said output means and comparing said output with an electrical input corresponding to a subsequent postage value for said meter, and then supplying an electrical output based upon the comparison;
input means operatively connected to said comparator means for providing the electrical input corresponding to a subsequent postage value for said meter; and
pulse generating means connected to said comparator means and said stepper motor for receiving the electrical output from the comparator, and then generating a pulse output for said stepper motor to set the actuator assembly from the present setting to said subsequent setting.

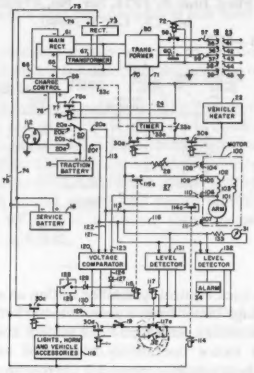
3,904,947
VEHICLE MOUNTED BATTERY CHARGING SYSTEM FOR AN ELECTRIC MOTOR VEHICLE

Roy E. Crews, 9412 Katherine Dr., Allison Park, Pa. 15101

Filed Aug. 22, 1973, Ser. No. 390,368
Int. Cl.² H02J *7/00;* **B62D** *45/00*
U.S. Cl. 320—2 **1 Claim**

1. A battery charging system located on board an electric motor vehicle for enabling the vehicle traction battery to be recharged from conveniently located alternating-current power outlets wherein the battery charging system comprises: converter means located on the electric motor vehicle for converting alternating-current power into direct-current power;
charge control means located on the electric motor vehicle for supplying direct-current energy from the converter means to the vehicle traction battery at a controlled rate; plug-in type alternating-current connector means located on the electric motor vehicle for enabling an alternating-current power outlet located off of the vehicle to be easily connected to the converter means, such connector means including a pair of high voltage alternating-current contact members and a pair of low voltage alternating-current contact members;

switch means for selectively connecting one or the other but not both pairs of the alternating-current contact members to the converter means;



and voltage responsive automatic control means for determining which of the two alternating-current voltages is present and controlling the switch means to supply same to the converter means.

3,904,948

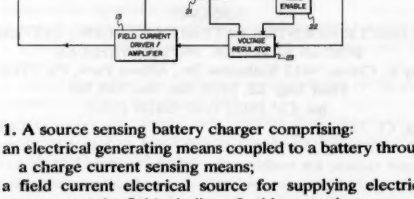
SOURCE SENSING BATTERY CHARGER

John L. Earle, 4024 Hempstead Cir., San Diego, Calif. 92116

Filed Nov. 18, 1974, Ser. No. 524,570

Int. Cl.² H02J 7/00, 7/14

U.S. Cl. 320—13 **4 Claims**



1. A source sensing battery charger comprising:

an electrical generating means coupled to a battery through a charge current sensing means;

a field current electrical source for supplying electrical current to the field winding of said generating means;

disabling means coupled between said charge current sensing means and said field current electrical source means operable for disabling said field current electrical source means when a zero charging current condition exists between said generating means and said battery; and

interrogating means coupled between said charge current sensing means and said field current source means for periodically enabling said field current source means, whereby when said field current source means is enabled by said interrogating means, and if a charging current exists between said generating means and said battery and said disabling means being operable to sustain enabling of said field current source means.

3,904,949

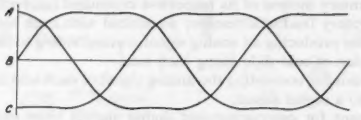
APPARATUS AND METHOD FOR INCREASING THE SINUSOIDAL LINE-TO-LINE OUTPUT VOLTAGE LEVEL OF ANY MULTI-PHASE POWER AMPLIFIER OPERATING AT A MAXIMUM LINE-TO-GROUND OUTPUT VOLTAGE LEVEL

James A. Ross, La Jolla, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Jan. 31, 1974, Ser. No. 438,228

Int. Cl.² H02M 1/12

U.S. Cl. 321—9 R **5 Claims**



1. Apparatus for increasing the maximum available phase-to-phase output voltage level of a multi-phase amplifier operating at a maximum phase-to-ground voltage level, comprising:

square wave generator; for producing a plurality of separate phase related voltage signals of a selected frequency; and electrical circuit means connected in series between said square wave generator and said amplifier for reforming each of said plurality of separate phase related signals from said square wave generator to a voltage signal having the waveform $2/\sqrt{3}$ sine $\phi + 1/6$ (sine 3ϕ).

3,904,950

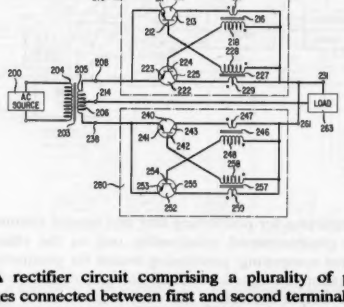
RECTIFIER CIRCUIT

Frank Fuller Judd, Madison, and Helmut Wilhart, Whippany, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Jan. 27, 1975, Ser. No. 544,234

Int. Cl.² H02M 7/23

U.S. Cl. 321—27 R **14 Claims**

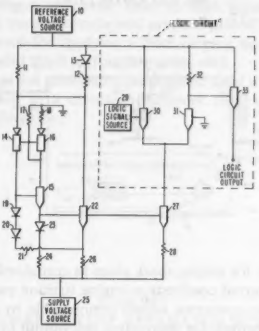


1. A rectifier circuit comprising a plurality of parallel branches connected between first and second terminals, each branch comprising a controllable rectifier device having input, output, and control electrodes and a coupling device connected between said output electrode and said second terminal and to the control electrode of the succeeding branch, said rectifier device input electrode being connected to said first terminal, said coupling device being adapted to couple a signal corresponding to the conduction of said branch to the control electrode of the succeeding branch, the coupling device of the last of said branches being connected between the last branch output electrode and said second terminal and to the control electrode of the first of said parallel branches and being adapted to couple a signal corresponding to the conduction of said last branch to the control electrode of the first of said parallel branches.

3,904,951
EMITTER COUPLED LOGIC CURRENT REFERENCE SOURCE

John Edwin Gersbach, Burlington, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 11, 1974, Ser. No. 441,525
Int. Cl.[2] H03K 17/00; G05F 1/56
U.S. Cl. 323—4 4 Claims



1. A highly stable current reference circuit for providing an accurate current to an output load over a wide range of temperature values, transistor values or voltage fluctuations comprising

a first NPN transistor having an emitter coupled to a voltage source, a base and a collector and means for establishing a fixed current through said NPN transistor,

said means including a second NPN transistor having a base, an emitter, and a collector, a PNP transistor having a base and a emitter-collector circuit, and means for applying a voltage to the base of said PNP transistor, said PNP transistor having its collector coupled to the base of said first NPN transistor through the base emitter circuit of said second NPN transistor and its emitter coupled to the collector of said first transistor to provide a path for negative feedback through the emitter-collector circuit of said PNP transistor and coupled through an impedance to a voltage source,

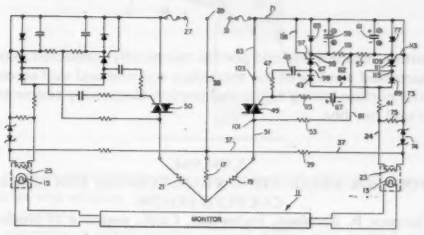
said second NPN transistor having a base connected to the collector of said PNP transistor, an emitter connected to the base of said first NPN transistor, and a collector coupled to the base of said PNP transistor to provide a positive feedback circuit through the base collector circuit of said PNP transistor and the base collector circuit of said second NPN transistor.

3,904,952
SELF SYNCHRONIZING ZERO CROSSOVER SWITCHING CIRCUIT

Egils Evalds, Ardmore, Pa., assignor to Athena Controls Inc., West Conshohocken, Pa.

Filed Jan. 10, 1974, Ser. No. 432,214
Int. Cl.[2] G05F 1/10
U.S. Cl. 323—24 7 Claims

1. A self-synchronizing zero cross-over switching circuit comprising in combination: at least first and second applied signal terminals adapted to have an alternating current signal with zero cross-over characteristics applied thereto; first and second signal storage means; bi-directional current switching means having control current conducting means, first current conducting means, and second current conducting means, said first current conducting means connected to said first applied signal terminal; first circuitry means connecting said second current conducting means to said second applied signal terminal; second circuitry means connecting said first signal storage means to said control current conducting means; third circuitry means connecting said first signal storage means to said second applied signal terminal, said third circuitry means including a first unidirectional electrical current conducting means whereby when said second applied signal terminal has a positive voltage polarity relative to said first applied signal terminal, said first signal storage means will develop a voltage there across; fourth circuitry means connecting said second signal storage means to said control current conducting means; fifth circuitry means connecting said second signal storage means to said third circuitry means, said fifth circuitry means including a second uni-directional electrical current conducting means whereby when said first applied signal terminal has a positive signal relative to said second applied signal terminal, said second signal storage means will develop a voltage thereacross; signal switching network



means connected to said third and fifth circuitry means as well as to said first applied signal terminal and said first circuitry means whereby when said second applied signal terminal expcriences a zero cross-over with the applied signal going negative thereat, said first signal storage means will apply a negative pulse to said control current conducting means causing said bi-directional current switching means to conduct electrical current from said first applied signal terminal to said second applied signal terminal and whereby when said second applied signal terminal experiences a zero cross-over with the applied signal going positive thereat, said second signal storage means will apply a positive pulse to said control current conducting means causing said bi-directional current switching means to conduct electrical current from said second applied signal terminal to said first applied signal terminal.

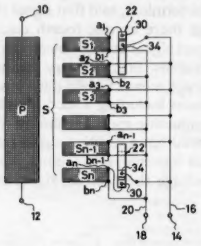
3,904,953
COIL ARRANGEMENT OF AN ELECTRICAL EQUIPMENT WHEREIN A COMPENSATING IMPEDANCE PROVIDES UNIFORM DISTRIBUTION OF INTERNAL IMPEDANCE AND CURRENT

Ikuro Hirano, Tokyo, Japan, assignor to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed May 28, 1974, Ser. No. 474,105
Claims priority, application Japan, May 29, 1973, 48-63066
Int. Cl.[2] H02M 5/10; H02P 13/04
U.S. Cl. 323—44 R 4 Claims

1. A coil arrangement for electrical induction equipment, comprising a primary coil unit, a secondary coil unit including a plurality of separate windings which are positioned in neighboring relation to each other in an axial direction of the secondary coil unit and which are electrically connected in parallel to a common bus line, and an impedance compensating element connected between said bus line and each of the windings located at axial ends of the secondary coil unit, said impedance compensating element comprising axially spaced parallel first and second ring-shaped portions which are substantially identical in diameter and which have circumferentially spaced ends which are substantially in alignment with each other in the axial direction of the secondary coil unit, a first axial portion which extends in the axial direction of the secondary coil unit and through which the first and second ring-shaped portions are connected together at one end of

each of the ring-shaped portions, and a second axial portion which extends substantially in parallel to said first axial portion from the other end of the second ring-shaped portion toward the first ring-shaped



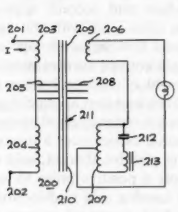
portion having a free end portion electrically connected to the associated winding of the secondary coil unit and said second axial portion having a free end portion electrically connected to said bus line.

3,904,954

VOLTAGE REGULATING TRANSFORMER FOR SERIES COUPLED LOADS

Clarence B. Knudson, Inglewood, Calif., assignor to Hughey and Phillips, Burbank, Calif.

Filed Nov. 16, 1973, Ser. No. 418,862
Int. Cl.[2] G05F *3/06*
U.S. Cl. 323—48 **10 Claims**



1. A transformer circuit including:

a primary winding adapted for the passage therethrough of a range of primary currents;

a secondary winding; and

a core having a central cross-shaped portion of material exhibiting square-loop magnetic characteristics, said cross-shaped portion having first, second and cross-arm sections, said core including, in addition, a perimeter member of material exhibiting low magnetic reluctance and having upper, lower and side sections, said upper and lower sections of said perimeter abutting said first and second sections of said cross-shaped portion, respectively;

said primary winding having first and second sections wound on said first and second sections, respectively, of said core;

said secondary winding having first and second sections wound about said first and second sections, respectively, of said core;

a condenser coupled across at least a portion of said first section of said secondary winding to produce a flow of leading current therein;

said first portion of said primary and secondary windings, respectively, being wound with sufficient numbers of turns to produce saturation of said first section of said core throughout said range of primary currents;

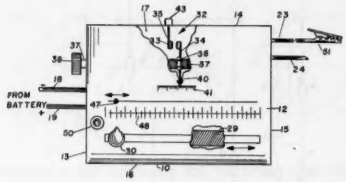
said second section of said primary being wound with a number of turns sufficient to produce saturation of said second section of said core at primary currents of a predetermined magnitude within said range but above the lower end thereof.

3,904,955

IN-CAR SPARK PLUG CHECKER

Ronnie Katz, Brooklyn, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Dec. 26, 1973, Ser. No. 428,003
Int. Cl.[2] G01R *13/42*
U.S. Cl. 324—17 **8 Claims**



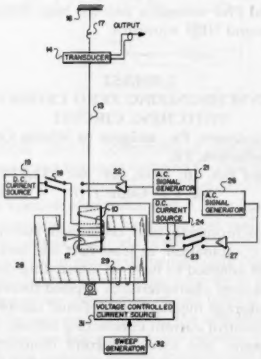
1. A device for testing spark plugs as contained in an engine and other internal combustion engine ignition parts, comprising electronic convertor means connectable to a direct current engine battery for converting the output current of said battery to intermittent pulsating current, ignition coil means connectable to the output terminals of said convertor means for raising the voltage output therefrom to a voltage sufficiently large to jump across a spark plug gap, and adjustable gaugeable voltage gauge means for measuring the voltage at which a spark discharge on a spark plug being tested jumps across its spark gap, and said convertor means comprising multivibrator circuit means, transistor, resistor and capacitor means connected in said multivibrator circuit means and formed with input wiring terminals connectable to said battery, and output wiring terminals for delivery outwardly therefrom a direct current intermittent pulsating current.

3,904,956

ALTERNATING FORCE MAGNETOMETER

Kevin C. O'Brien, 5 Dobson Rd., East Brunswick, N.J. 08816, and Robert D. Reasenberg, 16 Garfield St., Lexington, Mass. 02173

Filed Feb. 26, 1973, Ser. No. 335,453
Int. Cl. G01r *33/12*
U.S. Cl. 324—345 **4 Claims**



1. In a device for measuring magnetic properties of a specimen of matter in a measuring region:

first means for mounting said specimen of matter in said measuring region;

second means for measuring the magnitude of force variations on said specimen of matter in a predetermined direction in said measuring region;

third means responsive to a signal applied thereto for generating a magnetic field in said measuring region which is uniform in said predetermined direction;

fourth means responsive to a signal applied thereto for generating a magnetic field in said measuring region which is nonuniform in said predetermined direction; and fifth means for applying a time varying signal to at least one of said third or fourth means; and

sixth means for generating a magnetic field in said measuring region in a direction different than said predetermined direction.

3,904,957

EDDY CURRENT TEST APPARATUS WITH PEAK SIGNAL VALUE STORAGE MEANS

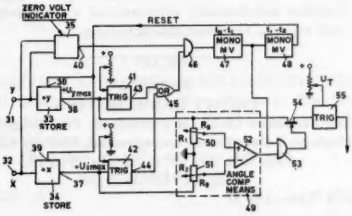
Alfons Griese, Rommelsbach, Germany, assignor to Institut Dr. Friedrich Forster, Prufgeratebau, Reutlingen, Germany

Filed June 27, 1974, Ser. No. 483,789

Claims priority, application Germany, Sept. 29, 1973, 2349046

Int. Cl.² G01R *33/12*

U.S. Cl. 324—40 **16 Claims**



1. An eddy current test apparatus for an elongated metallic workpiece comprising:

test coil means connected to a source of alternating current for inducing eddy currents in a workpiece portion under test and for providing in response to relative motion between said coil means and workpiece an anomaly responsive output signal whose amplitude and phase angle is responsive to the anomaly in the workpiece portion;

phase selective means including rectifying means coupled for receiving said anomaly responsive output signal and producing a pair of direct current signals responsive to the two mutually normal components of said anomaly responsive output signal;

at least a pair of storage means, each coupled for receiving and storing the peak value of one of said direct current signals, and

comparison means coupled to said storage means for receiving said stored peak values and comparing the ratio of said peak values with respect to a predetermined value.

3,904,958

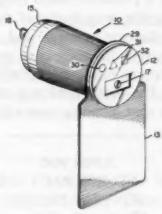
CIRCUIT TESTER INCLUDING INFORMATION DISPLAY MEANS FOR TESTING ELECTRICAL OUTLET RECEPTACLES

Albert John Gartland, Jr., Trumbull; John Phillip Goodsell, Stratford, and Ernest Gerhard Hoffman, Middlefield, all of Conn., assignors to Harvey Hubbell, Incorporated, Bridgeport, Conn.

Filed July 17, 1974, Ser. No. 489,425

Int. Cl.² G01R *31/02, 19/14*

U.S. Cl. 324—51 **12 Claims**



1. A circuit tester for testing electrical circuits within receptacles and sockets, comprising:

a housing;

electrical contact means secured within one end of said housing for facilitating insertion of said tester within said receptacles to be tested;

a plurality of indicator lamps disposed within said housing and adapted to be electrically connected with said electrical contact means whereby one or more of said lamps will or will not be illuminated in response to the propriety of the wiring of said circuits within said receptacles;

a cover secured within the other end of said housing opposite said end within which said contact means are secured and having a plurality of areas which are adapted to be illuminated by said indicator lamps; and

information display means, having wiring characteristics of the electrical circuit under test displayed thereon, connected to said other end of said housing and disposed in a side-by-side and substantially co-planar relationship with said cover and said plurality of areas to be illuminated whereby comparison of an illuminated area pattern with a correspondingly displayed wiring characteristic of said electrical circuit being tested is facilitated.

3,904,959

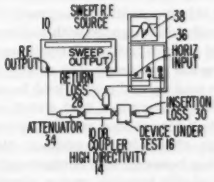
SWEPT FREQUENCY MEASUREMENT SYSTEM

Ralph H. Britton, Jr., Palo Alto, Calif., assignor to Pacific Measurements, Inc., Palo Alto, Calif.

Filed Aug. 5, 1974, Ser. No. 494,821

Int. Cl.² G01R *27/00*

U.S. Cl. 324—57 SS **5 Claims**



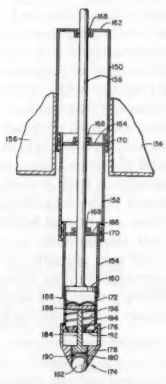
1. In a system for measuring the variations of magnitude of a test signal over a period of time, a corrector for eliminating recurrent error signals comprising:

input means for receiving the error signals;
a clock pulse generator;
means responsive to the output of the clock pulse generator for generating a recurrent cycle of calibrating signals whose magnitudes increase in stepwise fashion beginning from an initial level below the highest expected level of the error signal;
means for repeatedly comparing, at a plurality of discrete intervals during the time period, the magnitudes of the calibrating and error signals and for halting the increase in magnitude of the calibrating signal when the difference of the magnitudes of the calibrating signal and the error signal is within a predetermined range;
means for storing the magnitude of the halted calibrating signal at each discrete interval; and
means for displaying with respect to each discrete interval during a subsequent time period the difference in magnitudes between the test signal and the calibrating signal value stored at that discrete interval.

3,904,960
EXTENDABLE AND RETRACTABLE MOISTURE SENSING PROBE

William R. Niehaus, Cincinnati, Ohio, assignor to The E. W. Scripps Company, Cincinnati, Ohio

Division of Ser. No. 350,087, April 11, 1973, Pat. No. 3,841,205. This application July 12, 1974, Ser. No. 487,905
Int. Cl.[2] G01R *27/02*
U.S. Cl. 324—65 P **6 Claims**

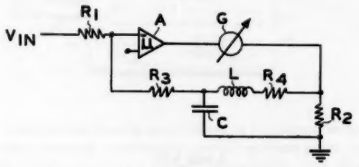


1. An extendable and retractable probe comprising a tubular housing having first and second ends, a reciprocable conductor rod extending coaxially into said housing through said first end and having a contact end within said housing and adjacent said second end, means interconnecting said housing and rod against relative axial displacement therebetween, a sleeve telescopically interengaged with said second end of said housing for axial reciprocation relative thereto between extended and retracted positions, said sleeve having an outer end spaced from said second end of said housing, a spherical contact ball, said outer end of said sleeve including means supporting said ball for rotation relative thereto and reciprocating movement therewith, a contact element disposed within said housing between said contact end of said rod and said second end of said housing, means electrically interconnecting said ball and said contact element including means interconnecting said contact element with said sleeve for reciprocation therewith, said contact element engaging said contact end of said rod when said sleeve is in said retracted position thereof and being axially spaced from said contact end when said sleeve is in said extended position, said sleeve being freely reciprocable relative to said housing, and spring means biasing said sleeve toward said extended position.

3,904,961
DYNAMIC LINEARIZER FOR ELECTROMAGNETICALLY DRIVEN MOVING COIL DEVICES

Bruno J. Vieri, Dallas, Tex., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 227,938, Feb. 22, 1972, abandoned. This application Oct. 1, 1973, Ser. No. 402,541
Int. Cl.[2] G01R *1/14, 15/10*
U.S. Cl. 324—125 **2 Claims**

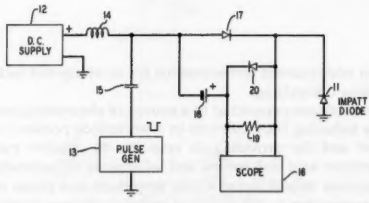


1. In a system for electromagnetically driving a moving coil device having a predetermined impulse response characteristic, said system including
an operational amplifier having its output coupled to provide driving current to said device and its input coupled to receive a driving signal,
an impedance coupled in the return path of the current to said device, and
feedback means coupled between said impedance and the input of said amplifier,
the improvement comprising three terminal network means connected in said feedback means for providing a transfer function substantially proportional to the reciprocal of said impulse response characteristic.

3,904,962
IMPATT DIODE TESTING

Hilding Matthews Olson, Jr., Mohnton, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 21, 1974, Ser. No. 516,793
Int. Cl.[2] G01R *31/26*
U.S. Cl. 324—158 D **7 Claims**



1. A method for evaluating the likelihood of catastrophic failure of an IMPATT diode comprising:
1. operating said diode in the avalanche condition;
2. then, applying to said diode a voltage pulse of a magnitude and polarity sufficient to withdraw the diode from the avalanche condition but without going into forward bias, for a short period of time; and
3. observing the leakage current through said diode during said short period of time.

3,904,963

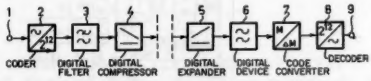
SYSTEM FOR THE TRANSMISSION OF ANALOG SIGNALS BY MEANS OF PULSE CODE MODULATION USING NON-RECURSIVE FILTERS

Maurice Georges Bellanger, Antony, and Jacques Lucien Daguet, St. Maur, both of France, assignors to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France

Continuation of Ser. No. 262,141, June 12, 1972, abandoned, which is a continuation of Ser. No. 61,342, Aug. 5, 1970, abandoned. This application Nov. 9, 1973, Ser. No. 414,375

Int. Cl.² H04B *1/00*

U.S. Cl. 325—38 B **10 Claims**



1. A system for the transmission of analog signals by means of a pulse code modulation, comprising a transmitter and a receiver, said transmitter comprising means to sample said analog signal at four times the maximum information frequency to be transmitted of said analog signal, a coder coupled to said sampling means to convert linearly said sampled signals to code groups comprising serial bits, a digital filter coupled to said coder, said digital filter being formed as a low pass, half band filter of the non-recursive type, and a digital compressor coupled to said digital filter, said receiver comprising a digital expander having an output which is similar to the input to said digital compressor, a digital filtering device for interpolating between code groups at the input means thereof to produce output code groups at at least four times the frequency of the input code groups thereof, said digital filtering device comprising a plurality of non-recursive filters, and a decoder being coupled to said digital filtering device for generating an output signal which is a reproduction of said analog signal.

3,904,964

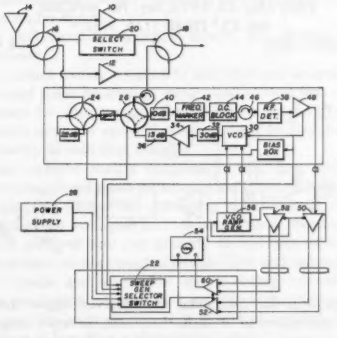
PARAMETRIC AMPLIFIER ALIGNMENT SYSTEM

Murray H. Mott, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 7, 1974, Ser. No. 449,160

Int. Cl.² G01R *27/00*

U.S. Cl. 325—67 **5 Claims**



1. In a system for calibrating and testing parametric amplifiers, the combination comprising;

a. an rf detector;

b. a voltage controlled oscillator for generating a linear fm signal,

c. a ramp signal generator coupled to said voltage controlled oscillator and providing a gating signal and a tuning voltage for gating on said voltage controlled oscillator for the duration of the time that said tuning voltage is applied to said voltage controlled oscillator;

d. selective switching means for selectively coupling said linear fm signal through a first circuit to said detector omitting said parametric amplifier to be tested for providing a reference calibration signal and through a second circuit to said detector including said parametric amplifier to be tested;

e. said first and second circuits including a high Q absorptive filter frequency marker for causing narrow dips to occur at the beginning and end of the frequency band of the parametric amplifier under test;

e. display means coupled to said ramp signal generator and to said rf detector for displaying the output signals from said detector.

3,904,965

ARRANGEMENT FOR INFORMATION TRANSMISSION

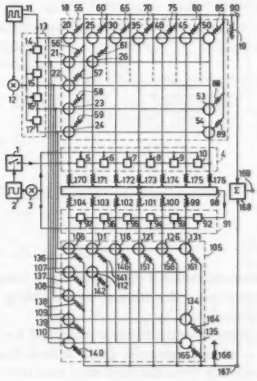
Peter Eugen Leuthold, Erlenbach, Switzerland, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 19, 1973, Ser. No. 398,586

Claims priority, application Netherlands, Oct. 3, 1972, 7213335

Int. Cl.² H04B *1/04;* **G06F** *15/34*

U.S. Cl. 325—141 **4 Claims**



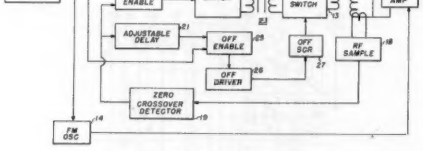
1. Apparatus for the transmission of information comprising a first signal source; a second signal source; a first control generator for providing shift pulses; a second control generator for providing further shift pulses; a first shift register connected to said first control generator and having a plurality of shift register elements; a second shift register; means connecting said second shift register to the second signal source and to the second control generator, said second shift register having a plurality of shift register elements whoe contents are shifted at the frequency of the second control generator; a matrix network provided with input circuits, output circuits and nodes; a plurality of modulation elements incorporated in the nodes of said matrix network; means connecting the input circuits of said matrix network to the shift register elements of the first shift register and to the shift register elements of the second shift register; a first plurality of weighting devices; means connecting the output circuits of said matrix network to said first plurality of weighting devices, a first combination device; means connecting an output of the first combination device to an input of said first shift register; means connecting an output of said first signal source to a further input of said

first combination device; a second plurality of weighting devices connecting shift register element outputs of said first shift register to further inputs of said first combination device; means for shifting said first shift register at a frequency equal to an integral multiple of the frequency of said first control generator; a second combination device connected to the first plurality of weighting devices in said matrix network and providing an output of said apparatus.

3,904,966
SYNCHRONIZED TURN-OFF OF VLF ANTENNAE

Carl M. Firman, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 31, 1972, Ser. No. 222,194
Int. Cl.² H04B *1/04*
U.S. Cl. 325—163 **7 Claims**



1. In a communication system having a reactance keyed antenna transmitting information by radiating signals of at least two frequencies:

a reactive element operatively connected for changing the resonance of said antenna from a first frequency when there is current flow through said reactive element, to a second frequency when there is no current flow through said reactive element;

means for developing a sample of the signal being fed to said antenna for transmission;

a zero current crossover detector for receiving said sample and generating an output signal responsive to the sample signal zero current crossover point detected;

switch means connected across said reactive element for controlling current flow therethrough;

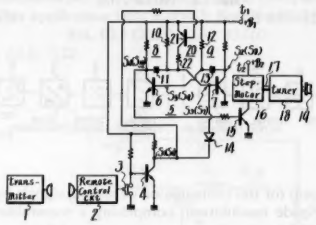
an enabling means responsive to a frequency shift command signal for changing the resonant frequency of said antenna from said first frequency to said second frequency upon the concurrence of said command signal with the output signal of said zero current crossover detector for actuating said switch means to its nonconducting condition; and

means for selectively varying the zero current crossover point of said sample relative to time for causing the actuation of said switch means when the signal at said first frequency is decreasing in amplitude and at a point in time sufficiently before its zero crossover for minimizing transient signal load on said switch means.

3,904,967
DRIVING CIRCUIT FOR A CHANNEL SELECTING SYSTEM

Hisao Okada, Yokohama, and Shigetoshi Murakami, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 21, 1974, Ser. No. 453,518
Claims priority, application Japan, Mar. 29, 1973, 48-36423
Int. Cl.² H03K *3/06;* **H04B** *1/06;* **H03K** *3/281*
U.S. Cl. 325—390 **8 Claims**



1. A driving circuit for a channel selecting system of the type including channel selecting means responsive to a pulse applied thereto for changing the channel selected by said system, the driving circuit comprising:

control signal generating means for selectively generating a control signal having a relatively long duration and for selectively generating intermittent control signals each being of less than a predetermined duration;

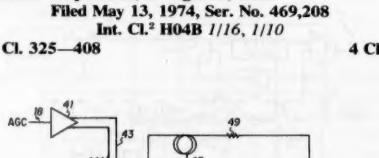
pulse generating means coupled to said control signal generating means and responsive to said relatively long duration control signal for generating repetitive output pulses having a predetermined period, said output pulses generated by said pulse generating means being applied to said channel selecting means; and

means for changing the operating parameters of said pulse generating means in response to said intermittent control signals of less than said predetermined duration to enable said pulse generating means to generate an output pulse in response to each control signal of less than said predetermined duration, the period of said last-mentioned output pulses being less than said predetermined period.

3,904,968
THRESHOLD EXTENSION SWITCH

Billy M. Brinegar, Campbell, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 13, 1974, Ser. No. 469,208
Int. Cl.² H04B *1/16, 1/10*
U.S. Cl. 325—408 **4 Claims**



1. Apparatus for extending the received signal threshold level of operation of a radio receiver incorporating AGC circuitry comprising the addition of a switching circuit connected in series with the detection circuitry of the receiver and the switching circuit comprises, in combination:

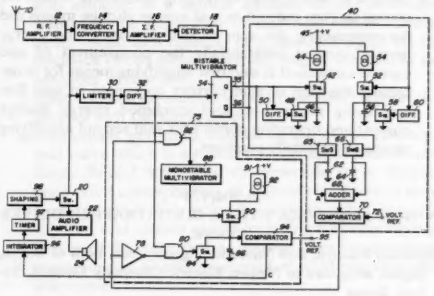
first means for receiving a signal to be transmitted therethrough;

second means for supplying a received signal amplitude responsive control signal;
signal delay means;
bandpass filter means;
switch means connected to said first means, said second means, said signal delay means and said bandpass filter means for normally passing the signal received from said first means to said signal delay means and in the alternative passing the signal received from said first means to said bandpass filter means when a control signal is supplied by said second means; and
third means connected to said signal delay means and said filter means for outputting a delayed version of the signal originally received by said first means.

3,904,969
AUDIO PERIODICITY SQUELCH SYSTEM

Bruce C. Eastmond, Darien, Ill., assignor to Motorola, Inc., Chicago, Ill.

Filed Mar. 7, 1974, Ser. No. 449,184
Int. Cl.² H04B *1/12*
U.S. Cl. 325—478 **10 Claims**

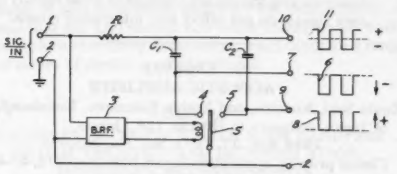


1. A squelch system for controlling the passage of audio signals including periodic signals received in the presence of noise, which system responds to the periodicity of the signals, including in combination:
pulse producing means for receiving an audio signal having first and second outputs providing pulses of opposite polarities, said pulses extending between zero crossings of the audio signal,
first and second capacitor means for storing voltages thereon,
first control means coupled to said first and second outputs of said pulse producing means and to said first capacitor means for charging said first capacitor means to a voltage which depends upon the duration of each pulse of one polarity at said first output,
second control means coupled to said first and second outputs of said pulse producing means and to said second capacitor means for charging said second capacitor means to a voltage which depends upon the duration of each pulse of said one polarity at said second output,
comparator means coupled to said first and second capacitor means and responsive to the voltage stored thereon for producing an output signal when the difference between the voltages on said first and second capacitor means is less than a given value; and
control circuit means including a squelch switch connected to receive the output signal from said comparator means and said audio signal to control the transmission of audio signals in response thereto.

3,904,970
LOCK-IN FILTER FOR NOISE REJECTION

Elbert N. Shawhan, West Chester, Pa., assignor to Sun Oil Company of Pennsylvania, Philadelphia, Pa.

Filed Feb. 11, 1974, Ser. No. 441,620
Int. Cl.² H03K *5/20;* **H04B** *1/12, 15/06*
U.S. Cl. 328—167 **12 Claims**

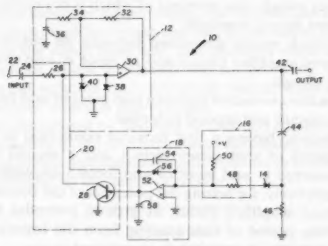


1. A lock-in circuit comprising a pair of terminals receptive of a noise-infested alternating signal voltage of unknown frequency and generated by a remote source, a pair of storage capacitors adapted to become charged from said voltage, means acting in response to said signal to connect one of said capacitors across said terminals to be charged during the positive half-cycles of said signal voltage and to connect the other of said capacitors across said terminals to be charged during the negative half-cycles of said signal voltage, and means for utilizing the voltages appearing on said capacitors.

3,904,971
AUTOMATIC GAIN CONTROL AMPLIFIER CIRCUIT

Arthur D. Delagrange, Sykesville, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 184,903, Sept. 29, 1971. This application June 6, 1974, Ser. No. 477,112
Int. Cl.² H03G *7/06*
U.S. Cl. 330—29 **1 Claim**



1. An automatic gain control amplifier circuit comprising:
variable attenuator means including the source to drain circuit of an n-channel field effect transistor acting as a variable resistor and a resistor forming a voltage divider with said field effect transistor for variably attenuating an input electrical signal;
a fixed gain amplifier including a first operational amplifier including a pair of oppositely connected diodes connected between the non-inverting input of said first operational amplifier and ground,
said first operational amplifier having its non-inverting input coupled to the output of said variable attenuator means for generating an output signal from said automatic gain control amplifier circuit;
a diode for rectifying the output of said fixed gain amplifier;
threshold detecting means for generating an output signal when the output of said diode is greater than a predetermined amplitude; and

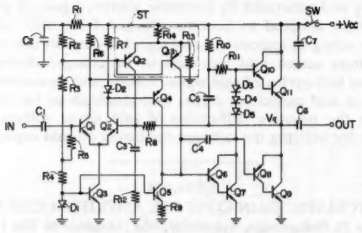
integrating means including a second operational amplifier coupled to the output of said threshold detecting means for integrating the output of said threshold detecting means with respect to time for controlling the attenuation of said field effect transistor, and an integrating capacitor and a diode connected between the inverting input and output of said second operational amplifier, wherein said integrating means has a time constant such that only slowly varying signals are attenuated while rapidly fluctuating signals do not affect said integrating means.

3,904,972

ACOUSTIC AMPLIFIER

Kunio Seki, Kodaira, and Yoshio Sakamoto, Kokubunji, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Apr. 27, 1973, Ser. No. 355,097
Claims priority, application Japan, May 10, 1972, 47-45500
Int. Cl.[2] H03F *3/68*
U.S. Cl. 330—22 **8 Claims**



1. An acoustic amplifier comprising:
a first amplifier circuit;
a second amplifier circuit having an input coupled to an output of said first amplifier circuit;
a power source terminal to which a source of power for said amplifier circuits is applied;
a power switch, one terminal of which is connected to said power source terminal;
a feedback means connected between an output of said second amplifier circuit and an input of said first amplifier circuit;
a capacitor connected between said input of said first amplifier circuit and ground potential;
first means, having a first terminal connected to another terminal of said power switch and a second terminal connected to said input of said second amplifier circuit, respectively, for setting the potential of the output of said second amplifier circuit at ground potential during a certain period of time starting from the instant of time when said power switch is closed; and
second means, having a first terminal connected to said another terminal of the power switch and a second terminal connected to said capacitor, respectively, for supplying a charging current to said capacitor during said period of time.

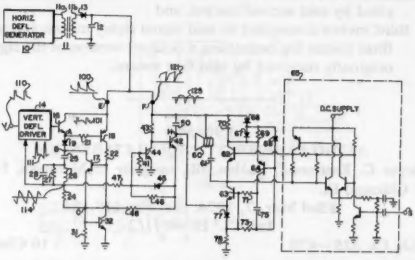
3,904,973

COMBINED AMPLIFIERS WHICH CONSUME SUBSTANTIALLY CONSTANT CURRENT

Peter Eduard Haferl, Adliswill, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Apr. 22, 1974, Ser. No. 462,840
Claims priority, application United Kingdom, Nov. 21, 1973, 53985/73
Int. Cl. H03F *3/68*
U.S. Cl. 330—22 **8 Claims**

4. Combined amplifiers which consume substantially constant current, comprising:
a direct current voltage source;
first and second amplifying means coupled to said direct current voltage source;
sensing means coupled to said first amplifying means for sensing current consumed therein;
energy storage means coupled to said direct current voltage source;
controllable current conducting means coupled to said sensing means and responsive to variations in current



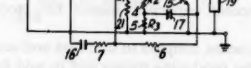
flow therethrough for providing a path for operating current in said second amplifying means and a path for energy storage current in said energy storage means and for maintaining the sum of said operating and energy storage current substantially the complement of said current consumed in said first amplifying means for maintaining the sum of said current consumed in said first amplifying means and said combined energy storage current and operating current for said second amplifying means substantially constant.

3,904,974

POWER AMPLIFIER WITH A BOOTSTRAPPED DRIVER STAGE

Hirokazu Fukaya, and Naotoshi Higashiyama, both of Tokyo, Japan, assignors to Nippon Electric Company Limited, Tokyo, Japan

Filed July 30, 1974, Ser. No. 493,652
Claims priority, application Japan, Aug. 2, 1973, 48-87349
Int. Cl.[2] H03F *1/38*
U.S. Cl. 330—26 **3 Claims**

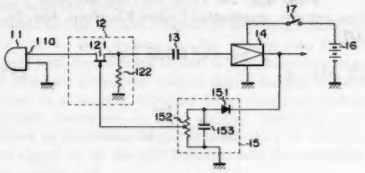


1. A power amplifier comprising:
a driver circuit comprising an input terminal, an output terminal, signal amplifying means and a load element formed by two separate resistors, a first end of the first resistor being connected to said signal amplifying means and a second end of said first resistor being connected to said second resistor;
an output circuit comprising at least one input terminal connected directly to the output terminal of said driver circuit, output transistors connected in a single-ended push-pull configuration, and an output terminal;
feedback means for supplying a feedback signal from the output terminal of said output circuit to said second end of said first resistor; and
a third resistor connected directly to and in parallel with said load element.

3,904,975
AUTOMATIC GAIN CONTROL CIRCUIT

Ken Satoh, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 23, 1974, Ser. No. 463,210
Claims priority, application Japan, Apr. 26, 1973, 48-50936; Aug. 22, 1973, 48-98485; Aug. 24, 1973, 48-99202
Int. Cl.² H03G 3/30; G11B 15/02
U.S. Cl. 330—29 10 Claims

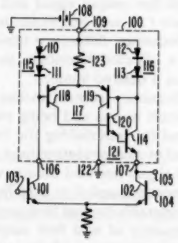


1. An automatic gain control circuit comprising:
a field effect transistor connected between the output of a signal source and the input of an output amplifier circuit; a feedback circuit means coupling an output terminal of said amplifier to a control terminal of said field effect transistor, the impedance of said field effect transistor being varied as a function of a feedback signal via said feedback circuit means from said output terminal of said amplifier circuit; and
a resistor circuit connected to said field effect transistor in parallel with the signal source;
said automatic gain control circuit having a noise characteristic curve which is a function of the signal source impedance thereof, said noise characteristic curve having a knee point corresponding to a given signal source impedance at which knee point the noise level begins to rapidly rise, said resistor circuit including a resistor having a resistance less than that of the signal source impedance corresponding to said knee point of said noise characteristic curve.

3,904,976
CURRENT AMPLIFIER

Adel Abdel Aziz Ahmed, Annandale, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 15, 1974, Ser. No. 461,229
Int. Cl.² H03F 3/04, 3/68
U.S. Cl. 330—30 D 28 Claims

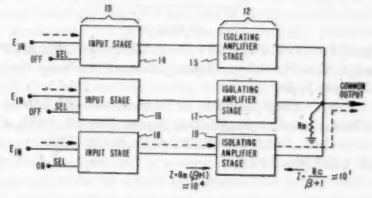


2. A current amplifier comprising:
an input, an output and a common terminals;
a differential amplifier having an inverting input port electrically connected between said input and said common terminals, having a non-inverting input port and having an output port;
a transistor having a collector electrode and having base and emitter electrodes with a base-emitter circuit therebetween to which the output port of said differential amplifier is coupled, said transistor emitter electrode being electrically connected to said output terminal;
a first non-linear resistance network electrically connected across the inverting input port of said differential amplifier;
and a second non-linear resistance network electrically connected between said transistor collector electrode and said common terminal as well as across the non-inverting input of said differential amplifier, the conductances of said first and said second non-linear resistance networks being in substantially fixed ratio to each other for a range of values of similar applied voltages.

3,904,977
MULTIPLEXING SWITCH WITH WIDE BANDPASS CHARACTERISTICS AND HIGH ISOLATION IMPEDANCE BETWEEN INPUTS

Rudolf H. Barsotti, Longmont, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 5, 1973, Ser. No. 403,759
Int. Cl.² H04B 7/02; H03F 1/14
U.S. Cl. 330—51 8 Claims



6. A switching array for selecting one of plurality of inputs for passage to a single output in response to a selected condition wherein each selectable channel in the array comprises:
a first amplifier means for amplifying the input signals when selected and for providing a first level of isolation from the output when non-selected;
a second amplifier means connected between the output of said first amplifier means and said single output for amplifying the signal from said first amplifier when said first amplifier means is selected and for providing a second level of isolation from said single output when said first amplifier means is non-selected;
bias means shared by said first and second amplifier means responsive to the select condition for biasing both amplifying means simultaneously into isolation or amplification depending on the select condition.

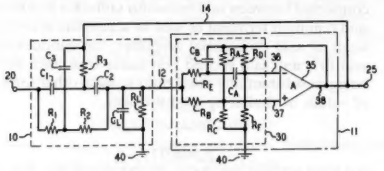
3,904,978
ACTIVE RESISTOR-CAPACITOR FILTER ARRANGEMENT

Richard William Daniels, and Carl Ferdinand Kurth, both of Andover, Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 8, 1974, Ser. No. 495,639
Int. Cl.² H03F 1/36
U.S. Cl. 330—109 12 Claims

1. An active filter having a predetermined fourth-order transfer function which comprises:
a single gain unit having at least one input and an output;
a first attenuation versus frequency determinate circuit arrangement connected in circuit relationship with the input and output of said gain unit, said first circuit in conjunction with said gain unit yielding a first predetermined second-order transfer function having first predetermined pole-zero pairs; and
a second attenuation versus frequency determinate circuit arrangement connected in circuit relationship with said first circuit and with the output of said gain unit, said

second circuit in conjunction with said gain unit yielding a second predetermined second-order transfer function having second predetermined pole-zero pairs, said pole-zero pairs of said first and second circuits being separated in frequency so that said first and second circuits do not



cause appreciable distortion of the filter transfer function in the frequency band in which the other of said circuits is affecting the attenuation characteristic of said filter, wherein a signal to be filtered is supplied to an input of said second circuit and a filtered version of the supplied signal is obtained at the output of said gain unit.

3,904,979

PROTECTIVE CIRCUIT FOR TRANSISTOR AMPLIFIER

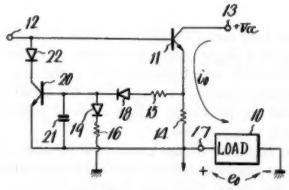
Tadao Suzuki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed July 24, 1973, Ser. No. 382,139

Claims priority, application Japan, July 27, 1972, 47-75414

Int. Cl. H03f *21/00;* **H02h** *7/00*

U.S. Cl. 330—207 P **9 Claims**



1. A protective circuit for a transistor amplifier comprising:

a. an amplifying stage including first and second opposite conductivity transistors each having base, emitter and collector electrodes and connected in series across a voltage source;

b. a signal input circuit coupled to the base electrodes of said transistors;

c. an output terminal connected to the connection point between said first and second transistors;

d. a load connected between said output terminal and a reference point through a first resistor;

e. a first diode and a first capacitor connected in series across said first resistor;

f. a second diode connected with the same polarity with respect to said first diode between the connection point of said first diode with said first capacitor and said reference point;

g. a third diode and a second capacitor connected in series across said first resistor, the polarity of said third diode being opposite in polarity with respect to said first diode;

h. a fourth diode connected with the same polarity with respect to said third diode between the connection point of said third diode between the connection point of said third diode with said second capacitor and said reference point;

i. a third transistor the base and emitter electrodes of which are connected across said first capacitor and the collector electrodes of which is connected to the base electrode of said first transistor; and

j. a fourth transistor the base and emitter electrodes of which are connected across said second capacitor and the collector electrode of which is connected to the base electrode of said second transistor.

3,904,980

DISPLACED SPECTRUM FREQUENCY SYNTHESIZER

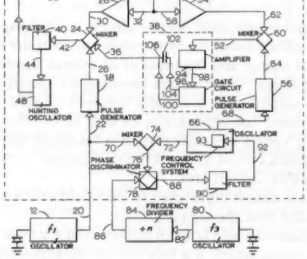
Eduard Herman Hugenholtz, 16 Brucedale Cres., Willowdale, Ontario, Canada

Filed Apr. 24, 1974, Ser. No. 463,492

Claims priority, application United Kingdom, Apr. 26, 1973, 19843/73

Int. Cl.² H03B *3/04*

U.S. Cl. 331—4 **13 Claims**



1. a frequency synthesis system including:

1. means for producing a first harmonic spectrum containing harmonics of a primary reference frequency;

2. a controllable oscillator for generating a first output signal of variable frequency f_o and including a first frequency control means for tuning said controllable oscillator over a predetermined frequency range and for locking said first output signal to a predetermined frequency, said frequency range including a selected portion of said harmonic spectrum;

3. first circuit means coupled to said controllable oscillator and to said means (1) for comparing the phase of said first output signal with the signal generated by said means (1) and operable to produce a first control signal having an amplitude dependent on the relative phase difference between said first output signal and the signal generated by said means (1), said amplitude having a unique value when the frequency difference beween said first output signal and a selected harmonic in said first harmonic spectrum has a desired value;

4. said first frequency control means being connected to said first circuit means and being responsive to said first control signal for establishing the frequency of said first output signal at said predetermined frequency when said first control signal has said unique value;

5. sweeping means coupled to said first frequency control means and operably by said first control signal for sweeping the frequency of said first output signal across said first harmonic spectrum when said first output signal frequency is different from said predetermined frequency;

6. controllable signal generator means for producing a second harmonic spectrum containing harmonics of an auxiliary reference frequency;

7. a second frequency control means having first and second signal inputs connected to said means (1) and to said means (6) for comparing the frequency difference between the output signal frequency of said means (1) and

(6) with sub-harmonics of a programmed reference signal having a frequency equal to a first selected fixed frequency and for generating a second control signal; said second control signal being coupled to said means (6) for controlling said second harmonic spectrum so that the harmonics in said second harmonic spectrum have a predetermined relationship with the harmonics in said first harmonic spectrum and one specific harmonic in said second harmonic spectrum differs in frequency from said selected harmonic in said first harmonic spectrum by said first selected fixed frequency;

8. second circuit means coupled to said controllable oscillator and to said means (6) for mixing said first output signal with frequencies in said second harmonic spectrum to produce a second output signal having a frequency equal to a second selected fixed frequency when said specific harmonic in said second harmonic spectrum differs in frequency from the frequency of said first output signal by an amount equal to said first selected fixed frequency; and

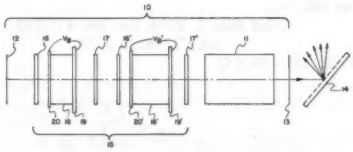
9. gate means coupled to said means (8) and responsive to said second output signal and coupled to said means (3) for producing a third control signal to enable said means (3) when the frequency of said second output signal is within a predetermined frequency range centered about a frequency equal to said second selected frequency, whereby said means (3) is enabled and generates said first control signal thereby establishing the frequency of said first output signal at said predetermined frequency.

3,904,981

ULTRAFAST SPATIALLY SCANNING LASER SYSTEM

Richard Swart Hughes, China Lake, Calif., and Robert D. Matulka, Falls Church, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 10, 1974, Ser. No. 513,783
Int. Cl.[2] H01S *3/10*
U.S. Cl. 331—94.5 K **5 Claims**



1. An ultrafast spatially scanning laser system comprising:

a laser cavity;

a laser medium continuously tunable over a bandwidth positioned within said laser cavity for providing an output laser beam;

an electronically tunable bandpass filter positioned within said cavity in optical alignment with said laser medium;

tuning means operatively connected to said filter for causing the passband of the filter to be scanned in wavelength thereby causing the output wavelength of the laser to change accordingly; and

an extracavity dispersive element in optical alignment with said laser medium and said filter for changing the wavelength scan of the laser into a spatial scan of the laser beam.

3,904,982

BROAD BAND EXCIPLEX DYE LASERS

Andrew Dienes, Middletown; Charles Vernon Shank, Holmdel, and Anthony Marion Trozzolo, Murray Hill, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Continuation of Ser. No. 37,825, May 15, 1970, abandoned. This application Sept. 5, 1972, Ser. No. 286,256
Int. Cl. H01s *3/20*
U.S. Cl. 331—94.5 L **2 Claims**

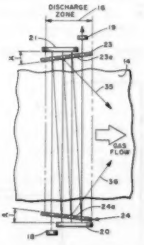
1. Dye laser comprising a resonant cavity defined by two end members at least one of which is a partially reflecting member through which laser output is transmitted, said cavity containing a medium consisting essentially of a solution of at least two ingredients, one of which in its unmodified state is electronically excitable to produce a first lasing species, and at least one of which undergoes a chemical change in its electronically active state to produce a second lasing species, said laser including means for producing a population inversion therein together with means coupled to said medium for stimulating the emission of a coherent beam of radiation from said population inverted medium, characterized in that the reaction conditions are such that both of said first and second lasing species are produced each in a minimum amount of 10 mol percent based on the total amount of electronically active material produced, and in which the said partially reflecting member is partially reflecting over a bandwidth defining a laser output spectrum including wavelenghts within the spectra of said first and second lasing monoalkyl, but extending beyond the individual spectrum of each of the said species so as to transmit laser output over such bandwidth and in which the peak emission wavelength of the said first and second lasing species are separated by a wavelength change of at least 500 Angstrom units, in which one ingredient is an electron acceptor, and in which a second ingredient is an electron donor, and in which the said electron acceptor is selected from the group consisting of unsubstituted polycyclic aromatic hydrocarbons containing from 2 to 5 rings as well as monalkyl, dialkyl and monochloro derivatives thereof, and the electron donor is selected from the group consisting of tertiary amines selected from the group consisting of $X–N–Y_2$ and $Y_2N—Z—NY_2$ where X is phenyl or naphthyl, Y is an alkyl grouping, and Z is phenylene, napthylene or biphenylene.

3,904,983

PARASITIC MODE SUPPRESSOR FOR HIGH POWER LASERS

Frederick E. Moreno, Los Altos; Russell F. Kirk, Sunnyvale, and Jack D. Foster, Los Altos, all of Calif., assignors to GTE Sylvania Incorporated, Mountain View, Calif.

Filed Apr. 16, 1973, Ser. No. 351,800
Int. Cl.[2] H01S *3/08, 3/22*
U.S. Cl. 331—94.5 C **4 Claims**



1. In a high power laser having an optical cavity defined in part by a pair of folding mirrors on opposite sides of the laser discharge zone, the improvement of a parasitic mode suppressor comprising

an optical reflector disposed between one of the folding mirrors and the discharge zone within which parasitic oscillation modes are generated and having a reflecting surface inclined at an acute angle greater than zero-degrees with respect to the plane of reflection of said one folding mirror for reflecting said parasitic oscillation modes incident upon it out of said discharge zone,

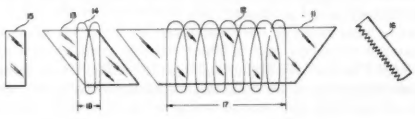
said reflector having a plurality of apertures aligned respectively with the portions of said one folding mirror from which the primary laser beam is successively reflected.

3,904,984

MODE-LOCKING SATURABLE ABSORBER FOR PRODUCING PICOSECOND AND SUB-PICOSECOND OPTICAL PULSES

Herschel S. Pilloff, Oxon Hill, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 17, 1973, Ser. No. 407,365
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 M **2 Claims**



1. A method of mode-locking an organic dye laser having a saturable absorber cell and a dye cell containing an organic dye solution positioned within the optical cavity of said laser so as to intersect its optical axis, for producing picosecond and sub-picosecond pulses, which method comprises:

optically pumping said organic dye solution in said saturable absorber cell to produce transitions between excited triplet states;

subsequent to optical pumping said organic dye solution in said saturable absorber, flash lamp pumping said dye solution in said dye cell and

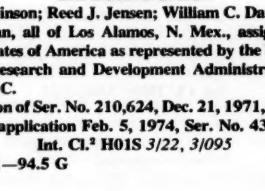
adjusting a wavelength selector in optical alignment with said dye cell to select a desired wavelength of operation.

3,904,985

EXPLOSIVE LASER

C. Paul Robinson; Reed J. Jensen; William C. Davis, and John A. Sullivan, all of Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Continuation of Ser. No. 210,624, Dec. 21, 1971, abandoned.
This application Feb. 5, 1974, Ser. No. 439,793
Int. Cl.² H01S 3/22, 3/095
U.S. Cl. 331—94.5 G **14 Claims**



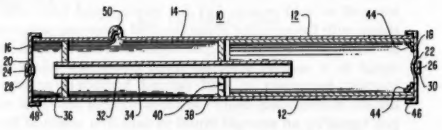
1. A method of forming a CO_2 lasing medium having a population inversion therein which comprises detonating pentaerythritol tetranitrate and allowing the products of said detonation to expand freely into vacuum.

3,904,986

GAS LASER TUBE

Karl Gerhard Hernqvist, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Apr. 19, 1974, Ser. No. 462,506
Int. Cl.² H01S 3/09
U.S. Cl. 331—94.5 G **16 Claims**



1. A gas laser tube comprising:

a. a gas-tight envelope having a longitudinal portion with opposite open ends:

b. metal end members sealing said open ends of said envelope portion, each of said end members having an aperture therethrough;

c. a capillary bore member disposed within said envelope portion and having a longitudinal bore aligned with said apertures through said end members;

d. a different reflecting means bonded to each one of said end members and sealing each said aperture therethrough; said reflecting means forming an optical resonant cavity with said bore; at least one of said reflecting means being partially transparent for passage of an output laser beam;

e. a laser gas within said envelope, and

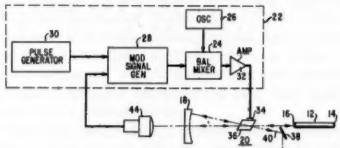
f. electrode means within said envelope for providing a gaseous discharge through said bore.

3,904,987

CAVITY DUMPING OF A LASER IN ITS UNSTABLE FREQUENCY REGIME

David Cheng, Bridgewater Twp., Somerset County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 7, 1974, Ser. No. 477,192
Int. Cl.² H01S 3/10
U.S. Cl. 331—94.5 Q **7 Claims**



1. Optical apparatus comprising

a laser including an optical resonator and an active medium disposed therein,

means for pumping said medium to generate a beam of optical radiation,

modulator means located within said resonator and approximately at the waist of said beam,

signal forming means for applying a periodic train of extraction pulses to said modulator to cause output pulses of optical radiation to exit from said resonator,

said laser having an unstable regime of operation wherein the amplitude and/or timing of said output pulses is random when the repetition rate of said extraction pulses is

at or near the relaxation oscillation frequency of said laser, characterized in that

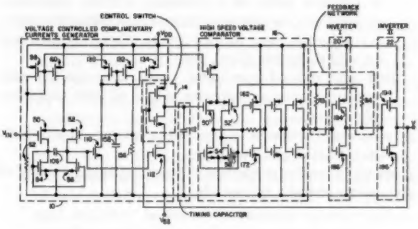
said laser is operating in said regime, and

said signal forming means includes means for applying to said modulator, after each extraction pulse is applied thereto, a holding pulse having an amplitude effective to keep said laser operating slightly above its threshold and having a duration so that after said holding pulse is removed, the internal power in said resonator is allowed to build up to approximately maximum before the next succeeding extraction pulse is applied to said resonator, so that said output pulses are stable in both amplitude and timing.

3,904,988
CMOS VOLTAGE CONTROLLED OSCILLATOR

Perng Hsiao, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Sept. 11, 1974, Ser. No. 505,194
Int. Cl.² H03K *4/50*
U.S. Cl. 331—111 **4 Claims**



1. A voltage controlled oscillator of the type generating an output signal which is linearly proportional to the voltage level of an input signal, comprising:

capacitor storage means for storing and discharging a charge at a rate proportional to the voltage level of the input signal;

current source generator means responsive to the applied input signal for generating a charging current and a discharging current, said charging current being equal in magnitude and opposite in direction to said discharging current, and said charging current and said discharging current being linearly proportional to the value of the input signal;

switching means intermediate said generator and said capacitor for controlling the flow of charge into and out of said capacitor;

voltage comparator means having a first input signal and a second input signal and being employed for generating a square wave output signal, and said output signal switching to a high state whenever said first input signal exceeds said second input signal;

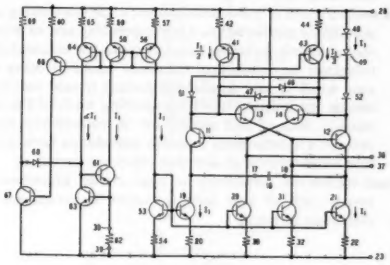
said first input signal being the signal stored on said capacitor; and

feedback means responsive to the output of said comparator for generating said second input signal to said comparator means.

3,904,989
VOLTAGE CONTROLLED EMITTER-COUPLED MULTIVIBRATOR WITH TEMPERATURE COMPENSATION

Robert Roger Cordell, New Shrewsbury, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 19, 1974, Ser. No. 507,569
Int. Cl.² H03K *1/04, 3/282*
U.S. Cl. 331—113 R **18 Claims**



1. A temperature-compensated emitter-coupled multivibrator comprising:

first and second transistors having an emitter electrode, a collector electrode, and a base electrode;

a timing capacitor connected between said emitter electrodes of said first and second transistors;

first and second current sources respectively connected between said first transistor emitter electrode and a terminal of fixed potential and between said second transistor emitter electrode and said terminal of fixed potential, the current produced by said first and second current sources controlled by a reference voltage;

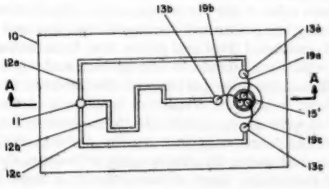
mens for controlling the collector currents of said first and second transistors so that said multivibrator changes states when the voltage across said timing capacitor substantially equals the junction voltage of a semiconductor junction carrying a current which is a predetermined multiple of the current produced by said first and second current sources; and

means for generating said reference voltage of said first and second current sources such that said reference voltage is substantially equal to said junction voltage of said semiconductor junction.

3,904,990
N-WAY POWER DIVIDER WITH REMOTE ISOLATING RESISTORS

Richard La Rosa, South Hempstead, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Filed June 7, 1974, Ser. No. 477,389
Int. Cl.² H01P *5/12*
U.S. Cl. 333—9 **12 Claims**



1. An isolated N-way power divider, where N is an integer

greater than one, for operation over a selected frequency band, comprising:

an input port;

a set of N output ports, each comprising first and second output terminals;

a first set of N transmission lines, each for coupling wave energy signals from said input port to a corresponding one of said output ports, each of said transmission lines having an electrical length of an odd integral multiple of one-quarter wavelength at a selected frequency within said frequency band;

a second set of N transmission lines, each comprising a first conductor connected to a corresponding one of said first output terminals and a second conductor connected to a reference terminal, said reference terminal being common to all of said second conductors in said second set;

means for independently terminating each of the transmission lines of said second set of transmission lines to present a substantially resistive impedance between said first output terminal and said reference terminal;

and means for presenting an open-circuit impedance between each of said second output terminals and said reference terminal.

3,904,991

STRIPLINE DIRECTIONAL COUPLER HAVING BENT COUPLING ARMS

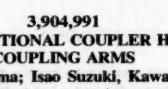
Takimi Ishii, Yokohama; Isao Suzuki, Kawasaki, and Torao Nagai, Yokohama, all of Japan, assignors to Tokyo Shibaura Electric Co., Ltd., Kawasaki, Japan

Filed Jan. 31, 1974, Ser. No. 438,404

Claims priority, application Japan, Feb. 12, 1973, 48-17212

Int. Cl. H01p 5/14

U.S. Cl. 333—10 **2 Claims**



1. A directional coupler comprising a first directional coupling unit including mutually insulated first and second strip lines having a length of $\lambda/4$ where λ is the wavelength of the handled signal which are crossed at one portion and run parallel to each other at the remaining portion, the first and second strips being bent, a second directional coupling unit including mutually insulated third and fourth strip lines having a length of $\lambda/4$ which are crossed at one portion and run parallel to each other at the other portion, the third and fourth strip lines being bent so that the respective both ends of the first and second strip lines are opposite to the respective both ends of the third and fourth strip lines, the first and second directional coupling units being directly coupled in tandem, the first and second lines being bent substantially at a right angle and crossed at the center thereof and the third and fourth strip lines being bent substantially at a right angle and crossed at the center thereof.

3,904,992

TWO-PORT NETWORK FOR SIGNAL TRANSMISSION EQUALIZATION

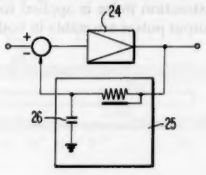
Takuya Iwakami, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Filed Feb. 8, 1974, Ser. No. 440,903

Claims priority, application Japan, Feb. 12, 1973, 48-17761

Int. Cl.² H03H 7/10, 7/14, 7/30; H04B 3/04

U.S. Cl. 333—18 **6 Claims**



1. A transmission line equalizer comprising:

a plurality of two-port networks each including

an input port,

an output port, one terminal of said output port being directly connected to one terminal of said input port,

a single one-port uniformly-distributed RC network connected between the other terminal of said input port and the other terminal of said output port, said single oneport uniformly-distributed RC network including

a dielectric plate having a uniform dielectric constant,

a resistive layer of a constant specific resistance formed on one major surface of said dielectric plate,

a conductive layer formed on the other major surface of said dielectric plate, and

first and second conductor strips disposed on said resistive layer at opposite edges of said dielectric plate, and

a capacitance element connected between said terminals of said output port, and

a plurality of buffer amplifiers connecting said plurality of two-port networks in cascade.

3,904,993

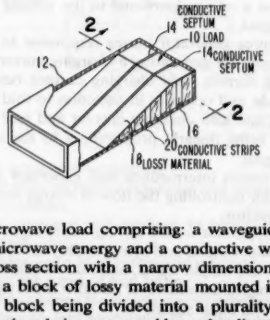
HIGH POWER SOLID MICROWAVE LOAD

Bertram G. James, Redwood City, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Jan. 31, 1974, Ser. No. 438,495

Int. Cl.² H01P 1/26

U.S. Cl. 333—22 R **8 Claims**



1. A microwave load comprising: a waveguide having an input for microwave energy and a conductive wall having an internal cross section with a narrow dimension and a wide dimension, a block of lossy material mounted in said waveguide, said block being divided into a plurality of sections, adjacent sections being separated by a plurality of electrically conductive septa imbedded in said block in heat-conductive relationship therewith, one edge of each of said septa being in thermal contact with said wall of said waveguide, the plane of each septum being oriented parallel to said narrow dimension

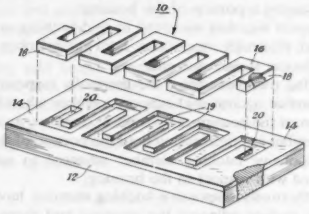
of said waveguide and parallel to the axis of said waveguide, the edge of each septum facing said input for microwave energy being substantially flush with the surface of said block facing said input.

3,904,994

MEANDER LINE CIRCUIT WITH AN INTERDIGITAL GROUND PLANE

Calvin D. Bates, Neptune, and Joseph H. Hartley, Jackson, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 8, 1974, Ser. No. 522,160
Int. Cl.² H03H *3/08;* **H01J** *23/24;* **H01P** *9/00*
U.S. Cl. 333—31 R **4 Claims**



1. A meander line slow wave circuit device comprising:
a unitary dielectric planar support, said dielectric support having a raised surface portion, said raised surface portion being shaped to form a meander line having a plurality of transverse and longitudinal segments disposed at right angles to each other, the transverse segments being substantially sized in length to be equally disposed on either side of the longitudinal axis of said planar support;
a conductive ground plane disposed on the upper surface of said dielectric support adjacent said raised portion of said dielectric to form a continuous planar surface surrounding said raised dielectric portion; and
a conductor disposed on the upper surface portion of said raised dielectric portion.

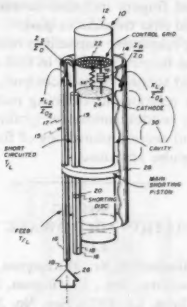
3,904,995

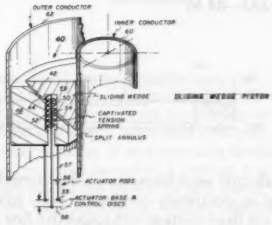
ULTRA HIGH FREQUENCY IMPEDANCE ADJUSTMENT MEANS

Edwin N. Phillips, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 10, 1974, Ser. No. 487,115
Int. Cl.² H01P *5/00, 1/28;* **H03H** *7/38*
U.S. Cl. 333—33 **6 Claims**

1. An improved cavity type ultra high frequency impedance adjustment means comprising:
wave guide means having outer and inner concentric walls defining a tuning cavity therebetween,
a coaxial feed transmission line having inner and outer conductors and having a relatively small cross-section in comparison to said wave guide means,
said coaxial feed line terminated within said wave guide means to form thereof an incoming section and a tuning section with said incoming section outer conductor connected to said outer wave guide means wall and said tuning section outer conductor connected to said inner wave guide means wall,
a shorting disc slidably connected between said inner and outer conductors of said tuning section of said feed line, said shorting disc comprising radially moveable spring-biased wedge means for locking said shorting disc in fixed adjusted seated position, and





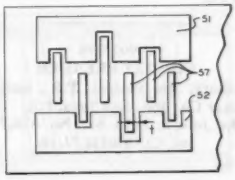
operating means connected to said spring to release said wedge bias when said disc is to be moved for impedance adjustment.

3,904,996

CAPACITIVE WEIGHTED ACOUSTIC SURFACE WAVE FILTER

Ronald C. Rosenfeld, Richardson, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed Dec. 28, 1973, Ser. No. 429,259
Int. Cl.² H03H *9/02, 9/06, 9/32;* **H01L** *41/10*
U.S. Cl. 333—72 **6 Claims**



1. An acoustic surface wave filter including at least one weighted transducer comprising:
substrate means including at least one surface of piezoelectric material,
an interdigital acoustic surface wave transducer disposed on said at least one surface of piezoelectric material, said transducer including
first and second transducer pads disposed on said piezoelectric surface in aligned spaced apart relationship,
a first plurality of fingers disposed on said piezoelectric surface and operably associated with said first transducer pad,
a second plurality of fingers disposed on said piezoelectric surface and operably associated with said second trans-

ducer pad, said second plurality of fingers being parallel to and interdigitated with said first plurality of fingers so as to have overlapping finger portions,

means defining respective capacitive relationships coupling the individual fingers included in said first plurality of fingers to said first transducer pad,

means defining respective capacitive relationships coupling the individual fingers included in said second plurality of fingers to said second transducer pad, and

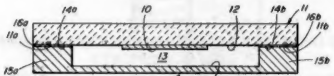
said capacitive relationship-defining means being selected to provide a predetermined weighting to the interdigitated first and second pluralities of fingers for obtaining a desired impulse response.

3,904,997

TRAPPED-RADIATION MICROWAVE TRANSMISSION LINE

Harold Eugene Stinehelfer, Sr., Burlington, Mass., assignor to Microwave Associates, Inc., Burlington, Mass.

Filed Sept. 13, 1973, Ser. No. 397,156
Int. Cl. H01p *3/08*
U.S. Cl. 333—84 M **15 Claims**



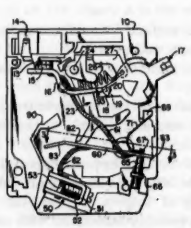
1. An electric wave transmission line comprising a dielectric body and an electrically-conductive body spaced apart a distance (h) in fixed relation with respective first surfaces of each confronting each other and forming in part the enclosing walls of an enclosed elongated channel of width (S), said conductive body having two side walls bounding said channel extending toward said dielectric body into contact therewith along two paths each having a width (y), an electrical conductor strip of width (W) supported on said first surface of the dielectric body within and extending along the channel, the dielectric body having a second surface outside the channel and opposite to said first surface, which second surface directly confronts the surrounding region free of any intervening electric conductor, said width (y) being approximately W/2, said width (S) being less than half a wavelength at the operating frequency, and being substantially two to three times greater than said width (W), said distance (h) being less than the quantity (S−W)/2.

3,904,998

CIRCUIT BREAKER

Harold E. Beltzary, Rio Piedras, P.R., assignor to Caribe Circuit Breaker Co., Inc., San Juan, P.R.

Filed June 5, 1974, Ser. No. 476,701
Int. Cl.² H01H *71/16*
U.S. Cl. 335—43 **7 Claims**



1. A circuit breaker including in combination

a housing of insulating material;

a fixed contact mounted in said housing;

a manually movable handle mounted in said housing;

a contact carrier with a movable contact thereon and pivotally engaging said handle at a pivot point;

a trip arm pivotally mounted in said housing;

an overcenter spring connected between said contact carrier and said trip arm urging said contact carrier against said handle;

said handle, contact carrier and overcenter spring forming an overcenter arrangement for closing said contacts when the spring is on one side of said pivot point and for opening said contacts when the spring is on the other side of said pivot point;

a load terminal mounted in said housing;

a thermally responsive latching member connected in circuit between said load terminal and said movable contact; one end of said thermally responsive latching member engaging a portion of the housing;

a support member mounted in said housing and engaging said thermally responsive latching member at a point adjacent to said one end;

a spring member urging the thermally responsive latching member against said support member whereby said portion of the housing, said support member, and said spring member in combination hold the portion of the thermally responsive latching member adjacent to said one end fixed with respect to the housing;

said thermally responsive latching member having a latching surface adjacent the opposite end thereof engaging said trip arm and maintaining said trip arm in a set position when said contacts are closed, with said overcenter spring urging said trip arm toward a tripped position;

said thermally responsive latching member bending in response to a predetermined current condition to move said opposite end of the thermally responsive latching member and disengage said latching surface from said trip arm releasing said trip arm for movement to the tripped position;

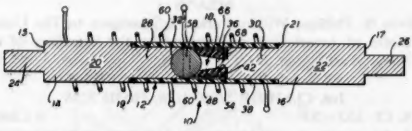
movement of the trip arm to the tripped position moving the overcenter spring to the other side of said pivot point causing said contacts to open.

3,904,999

SWITCHING DEVICE

Donald S. Rich, Flanders, and Norman Rudnick, Piscataway, both of N.J., assignors to Inflo Systems, Inc., Chester, N.J.

Filed June 7, 1974, Ser. No. 477,430
Int. Cl. H01h *29/02*
U.S. Cl. 335—52 **29 Claims**



1. A switch comprising:

a. housing means having a cavity therein;

b. an electrically conductive liquid within said cavity;

c. an armature means within said cavity and movable relative to said housing;

said armature means and said housing defining within said cavity a chamber;

said chamber comprises at least a first and second part; said first part of said chamber being joined to said second part at a common port;

the volume of said first part of said chamber being dependent upon said relative position of said armature means such that with said armature means in a first position, said liquid conductor is retained substantially within

said first part of said chamber; with said armature means being at least in a second position, said armature means displaces at least a part of said liquid conductor from said first part into said second part of said chamber; said port being so dimensioned such that, with said armature means being in said first position, said volume of said first part in combination with the forces of surface tension upon said liquid conductor and the volume of said liquid conductor within said first part, thereby resulting in said liquid conductor being retained substantially in said first part; upon said armature means moving relative to said housing to and from said second position, said port admitting said displaced liquid conductor between said first and second parts of said chamber; said first part being defined by at least walls of said housing and said armature means; said second part comprises walls of said armature means exclusive of said housing walls;

d. at least first and second electrical contacts communicating with said chamber from without said housing; said armature means in at least one of said relative positions, causing said liquid conductor to couple said electrical contacts and, in another of said relative positions said liquid conductor not coupling said contacts; and

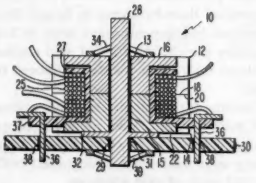
e. means for moving said armature means relative to said housing thereby coupling or uncoupling said contacts to operate said switch.

3,905,000

ELECTRONIC COMPONENT ASSEMBLY

Richard Kupp Walter, Lititz, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 7, 1975, Ser. No. 548,008
Int. Cl.[2] H01F *27/26*
U.S. Cl. 336—65 **10 Claims**



1. An electronic component assembly comprising:

a pair of core members each having a pair of opposing surfaces and each having an opening therethrough between said surfaces, said core members disposed with a surface of one of said core members in abutting relation with a surface of the other one of said core members and with said openings in aligned relation,

a shaft extending through said openings in said members and beyond the non-abutting opposing surface of each of said core members, said shaft including a flange of one-piece construction with said shaft abutting the non-abutting opposing surface of one of said core members with a portion of said shaft projecting beyond said flange so as to provide means for mounting onto a mounting platform, and

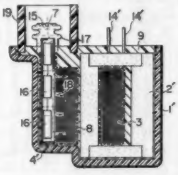
means fastening said pair of core members together and on said shaft, said means disposed in intimate relation with the other one of said core members.

3,905,001

OIL-FILLED ELECTRICAL INSTRUMENT

Kohei Sato, Kawanishi, and Yoshiaki Hayashi, Takarazuka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 24, 1973, Ser. No. 409,064
Claims priority, application Japan, Oct. 31, 1972, 47-109682; Oct. 31, 1972, 47-109683
Int. Cl. H01f *27/02*
U.S. Cl. 336—94 **6 Claims**



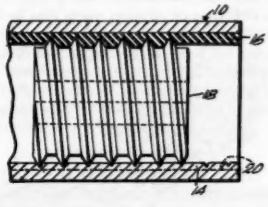
1. A fly-back transformer, comprising a coil; a layer of porous material surrounding substantially all of the surfaces of said coil, said coil and said porous layer being impregnated with an insulation oil; a core assembled with said coil into a coil-core assembly; a casing of an electrically insulating material housing said coil-core assembly; a passage extending outwardly from said coil to the outside of said casing to provide a pouring port for the insulation oil; and a substantially impervious layer of a plastic material filling up the space defined between said core, said coil, said passage and said casing.

3,905,002

COIL FORM

Richard H. McFarlane, 40 W. 589 Fair Oaks Dr., St. Charles, Ill. 60174

Continuation of Ser. No. 343,661, March 22, 1974, abandoned. This application May 21, 1974, Ser. No. 472,065
Int. Cl.[2] H01F *21/06*
U.S. Cl. 336—136 **8 Claims**

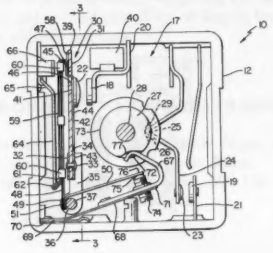


1. A coil form including a tubular length of circular cross section and of relatively rigid material, including a plurality of relatively rigid internal ribs projecting a substantially common radial distance into the column of the length, a threaded core within the length of a diameter less than the inside diameter of the tubular length and of a diameter greater than the diameter of a circle through the terminal ends of the ribs for threaded advancement or retraction of the core within the length and to resist axial displacement by axial forces on the core, and longitudinally extending flexible rib means in the column of the tubular length in engagement with the core and providing resistance to turning of the core to maintain a predetermined position of the core in the length.

3,905,003
ELECTRICAL SWITCH CONSTRUCTION AND PARTS THEREFOR

David M. Rosenberg, and Siegfried E. Manecke, both of Indiana, Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 28, 1974, Ser. No. 437,334
Int. Cl.[2] H01H 71/16
U.S. Cl. 337—54 23 Claims

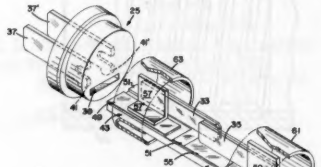


1. An electrical switch construction comprising a support means carrying a magnet, a movable armature being carried by said support means and being attracted by said magnet to tend to move toward the same, an electrical contact of said switch construction being carried by said armature to be moved thereby, a bimetal member carried by said support means and being operatively interconnected to said armature to move said armature away from said magnet when said bimetal member is in a certain operating condition thereof, and an electrical heater carried by said bimetal member for heating said bimetal member when said heater is energized, said heater having opposed ends, one of said ends of said heater engaging and being secured to said armature to operatively interconnect said bimetal member thereto. strip

3,905,004
SENSOR DEVICE AND METHOD FOR MAKING

Nikolaus A. Szevernyi, and Walter W. Bickmire, both of Warren, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 3, 1974, Ser. No. 466,635
Int. Cl.[2] H01H 71/16
U.S. Cl. 337—104 12 Claims

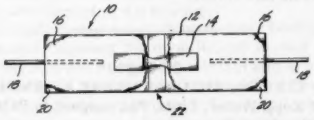


1. An improved sensor device comprising:
a housing member defining a chamber,
a thermally conductive member positioned substantially within said chamber,
a tip member secured to said housing and forming a closure for said chamber,
a substantially solid substrate member within said chamber and adapted for being readily removed from said chamber, said substrate member having first and second spaced apart portions and an intermediate portion therebetween, said first spaced apart portion in heat conductive relationship to said thermally conductive member, said second spaced apart portion in heat conductive relationship to said tip member;
electrical resistive heater means positioned on said intermediate portion of said substrate member, said electrical resistive heater means electrically insulated from said first spaced apart portion and electrically connected to said second spaced apart portion; and
first and second heat responsive members each having a free end positioned in heat conductive relationship to said electrical resistive heater means and adapted for engaging only when the temperature difference between the first and second spaced apart portions of said substrate member exceeds a predetermined level.

3,905,005
DEFLECTION-SENSITIVE ELECTRICAL TRANSDUCER WITH DEFLECTION FOCUSING

Thomas B. Hutchins, IV, 310 N.W. Brynwood Ln., Portland, Oreg. 97229

Continuation of Ser. No. 364,081, May 25, 1973, abandoned. This application Apr. 29, 1974, Ser. No. 465,236
Int. Cl.[2] G01L 1/22
U.S. Cl. 338—2 4 Claims



1. A deflection-sensitive electrical-signal-producing transducer comprising
an elongated electrically insulative carrier having along its length a uniform transverse cross-sectional configuration, a pair of spaced-apart metallic seats joined to a side of said carrier and disposed towards the opposite ends thereof,
an elongated piezoresistive element mounted on said seats and separated thereby along its length from said carrier, said element being positioned with its longitudinal axis substantially paralleling that of said carrier, and with its longitudinal midregion located adjacent that of the carrier, and
means accommodating electrical connections with opposite ends of said element, said means comprising a pair of spacedapart electrically conductive metallic blankets extending over said seats, and joined both to said seats and to said ends of said element,
said seats and blankets cooperating with one another to rigidify the ends of said carrier and said element, thereby to focus into said midregions any deflections experienced by the transducer.

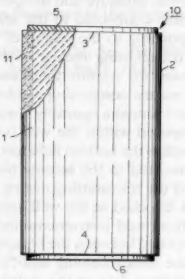
3,905,006
VOLTAGE DEPENDENT RESISTOR

Michio Matsuoka, 4-chome, Korigaoka, Hirakata, Osaka-fu; Gen Itakura, 3-14, Miyuki-Higashi-machi, Neyagawa, Osaka-fu; Atsushi Iga, 14-11, 1-chome, Daiwa, Takatsuki, Osaka-fu, and Takeshi Masuyama, 1-3, 1-chome, Yamatecho, Takatsuki, Osaka-fu, all of Japan

Division of Ser. No. 428,737, Dec. 27, 1973. This application Oct. 29, 1974, Ser. No. 518,944
Claims priority, application Japan, Dec. 29, 1972, 48-3619; Apr. 13, 1973, 48-42488; June 15, 1973, 48-68066; Dec. 29, 1972, 48-3610
Int. Cl. H01c 7/10
U.S. Cl. 338—21 2 Claims

1. A voltage dependent resistor comprising a zinc oxide sintered body itself having voltage dependent properties, a

covering layer on the side surface of said body having a thickness of more than 10μ, the portion of said covering layer up to a depth of 3μ from the side surface being comprised of



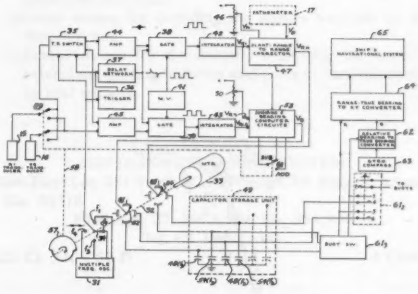
more than 70 mole % of at least one member selected from the group consisting of zinc silicate (Zn_2SiO_4) and zinc antimonate ($Zn_7Sb_2O_{12}$), and two electrodes applied to the opposite end surfaces of said body.

3,905,007

EQUIPMENT FOR LOCATING AND PLOTTING THE POSITION OF UNDERWATER TOWED VEHICLES

Calvin B. Koesy, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 27, 1962, Ser. No. 183,698
Int. Cl.² G01S *9/68*
U.S. Cl. 340—3 E **5 Claims**



1. In a system for indicating the relative position between a vehicle being towed submerged and a tow ship, the combination with an acoustic transponder mounted on the vehicle comprising:

first and second acoustic transducers spaced athwart on the tow ship,

means for transmitting an acoustic pulse from the first transducer to trigger said transponder,

means responsive to the transit time of acoustic energy from said first transducer to said transponder and return to said first transducer for providing a first voltage proportional to the slant range to said vehicle,

means responsive to said slant range voltage and to the depth of said vehicle for providing a second voltage proportional to the horizontal range to said vehicle,

means responsive to the transit time of acoustic energy from said first transducer to said second transducer via said transponder for providing a third voltage proportional thereto,

means establishing a fourth voltage proportional to the travel time of an acoustic pulse between said first and second transducers, and

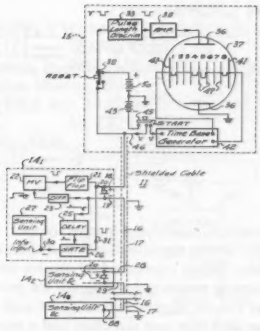
computer means connected to said first, third and fourth voltages for providing an output voltage proportional to the relative bearing of said vehicle.

3,905,008

SEQUENTIAL SAMPLING TELEMETRIC APPARATUS

Julius Hagemann, Panama City, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 23, 1960, Ser. No. 17,229
Int. Cl.² G08C *15/08*
U.S. Cl. 340—4 R **5 Claims**



3. In telemetric apparatus for sampling in rapid succession signal voltages of a given polarity on a plurality of information inputs, a signal voltage sampling network individual to each of said inputs and having first and second terminals, a semiconductor diode having its poles sharing said first and second terminals and arranged to conduct when a voltage of said given polarity is impressed on said second terminal, a single conductor serially connecting unlike poles of neighboring diodes for providing unidirectional conduction for said signal voltages, gate means individual to each information input for applying the signal voltages thereon to said first terminal of its associated sampling network, means for applying a trigger signal input of said given polarity to said first terminal, and means in said network having at least one condition in which it is sensitive to said trigger signal input for opening said gate means for a time interval and thereafter applying to its second terminal a voltage pulse of said given polarity whereby said voltage pulse appears on the first terminal of the neighboring sampling network as a trigger signal input.

3,905,009

TRANSDUCER ARRAY SCANNING SYSTEM

William J. Hughes; William Thompson, Jr., both of State College, and Richard D. Ingram, Boalsburg, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 20, 1974, Ser. No. 507,843
Int. Cl.² G01S *3/80*
U.S. Cl. 340—6 R **11 Claims**

1. A scanning system for directionally steering the beam pattern of an array of receivers, comprising:

first amplifying means adapted to receive output signals fron respective ones of the receivers for providing a plurality of weighted amplified output signals relative to each other;

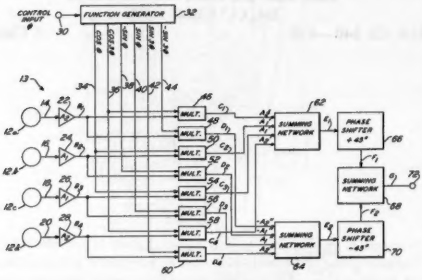
signal generating means adapted to receive a control signal indicative of the steering angle for generating a plurality

of output signals each indicative of a discrete sine and cosine function of the steering angle;

second amplifying means connected to receive said signal generating means output signals and said first amplifying means output signals for providing a plurality of weighted output signals each indicative of the product of selected ones of said first amplifying output signals and said signal generating means output signals respectively;

first summing means connected to receive the cosine-weighted second amplifying means output signals for providing an output signal indicative of the sum thereof;

second summing means connected to receive the sine-



weighted second amplifying means output signals for providing an output signal indicative of the sum thereof;

phase shifting means connected to receive said first and second summing means output signals for providing first and second output signals indicative of said first input signal phase shifted in one direction and a second output signal indicative of said second input signal phase shifted in an opposite direction; and

third summing means connected to receive said phase shifting means first and second output signals for providing an output signal indicative of the

element array output signals at the steering angle.

3,905,010

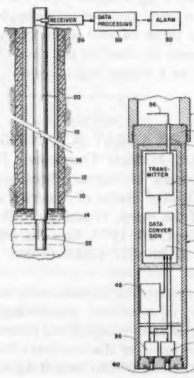
WELL BOTTOM HOLE STATUS SYSTEM

John Douglas Fitzpatrick, Tulsa, Okla., assignor to Basic Sciences, Incorporated, Tulsa, Okla.

Filed Oct. 16, 1973, Ser. No. 406,858

Int. Cl. G01v *1/40*

U.S. Cl. 340—18 NC **7 Claims**



1. A well bottom hole status indicator system for detecting fluid reservoir pressure and temperature at the bottom of the well bore having tubing extending from the well head to the well bottom hole fluid reservoir and comprising bottom hole instrumentation means removably installed in the well bore in the proximity of the bottom of the well tubing, said bottom hole instrumentation means comprising sensing means for sensing fluid reservoir pressure and temperature, data conversion means operably connected to the sensor means to produce data corresponding to the output of the sensing means, electromagnetic transmitting means operably connected to said data conversion for transmitting data to the well head, said transmitting means comprising a microwave transmitter having a microwave antenna operably connected thereto, said antenna being disposed within the well tubing, power supply means disposed within the bottom hole instrumentation means and operably connected to the sensing means, the data conversion means and the transmitting means; data receiving and processing means disposed at the well head for receiving and processing data from said instrumentation means; and wave guide means interposed between the bottom hole instrumentation means and the data receiving and processing means for guiding the transmitted data to the well head data receiving and processing means, said wave guide means being the tubing itself, the frequency of the microwave transmitter being tuned to an optimum frequency for transmission through the fluid in the tubing and along the inside wall of the tubing, and wherein the data receiver and processing means comprises the microwave receiver having a receiving antenna operably connected thereto, said antenna being disposed inside the tubing at the well head.

3,905,011

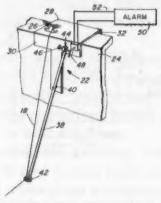
MARINE ANCHOR SENTRY SYSTEM

Gregory Nichols, 45 Forest St., Manchester, Mass. 01944

Filed Mar. 29, 1974, Ser. No. 456,064

Int. Cl.[2] G08B *21/00*

U.S. Cl. 340—29 **6 Claims**



1. A sentry system and apparatus for anchored marine objects comprising in combination:

a weighted line suspended beneath the marine object to be in contact with the bottom of a body of water;

drift monitoring means mounted on said marine object including pivotally supported means operatively associated with said line to detect angular displacement thereof relative to a predetermined reference position;

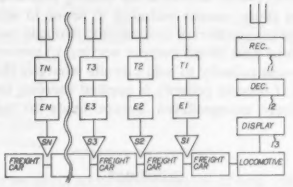
electromechanical switch means operatively connected to said pivotally supported means; and

alarm signalling means actuated when said pivotally supported means exceeds a predetermined angular displacement and contacts said electromechanical switch means to indicate an insecure drifting position.

3,905,012
DYNAMIC RAILROAD FREIGHT CAR MONITORING SYSTEM

Joseph D. Vrabel, Concord; Dennis W. Gosselin, Saugus; Eugene Donald Sussman, Natick, and David S. Ofsevit, Boston, all of Mass., assignors to The United States of America as represented by the Secretary of the Department of Transportation, Washington, D.C.

Filed Aug. 2, 1974, Ser. No. 494,098
Int. Cl.[2] B61L *15/00*
U.S. Cl. 340—48 **10 Claims**



1. Apparatus for dynamically monitoring the relative positions of railroad freight cars and comprising:

a plurality of individual sensors, each for detecting the extension on a coupling between a different pair of cars of a railroad train, said pairs of cars being distributed in locations along the length of the train;

a plurality of radio transmitters, one associated with each of said sensors and responsive thereto to produce an output signal indicative of the extension sensed thereby;

a plurality of encoders, one associated with and providing each of said transmitters with a uniquely coded output;

receiver means for receiving said output signals at a control station on the train;

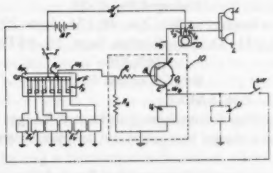
decoder means for decoding the signals received by said receiver; and

indicator means for dynamically indicating the coupling extensions existing between said pairs of cars and sensed by said sensors.

3,905,013
HEADLIGHT WARNING SYSTEM

Maw-Huei Lee, 251 Tenth St., N.W., Apt. 80, Bldg. 8, Atlanta, Ga. 30318

Filed Apr. 27, 1973, Ser. No. 354,934
Int. Cl. B60q *1/00*
U.S. Cl. 340—52 D **4 Claims**



1. A headlight warning apparatus for use on a vehicle having a first circuit controlled by an ignition switch and a headlight switch for controlling the operation of the headlights through a second circuit independently of the ignition switch comprising:

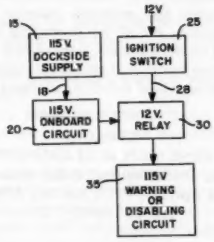
signal means having a hot terminal and a ground terminal directly electrically grounded for generating a warning signal upon receipt of an electrical voltage at said hot terminal; and,

a control means having a first input; a second input; and an output, said first input operatively connected to the first circuit so as to have voltage supplied thereto only when the ignition switch is closed; said second input operatively connected to the second circuit so as to have voltage supplied thereto only when the headlight switch is closed, and said output operatively connected to said hot terminal on said signal means; said control means constructed and arranged to cause the voltage imposed on said second input to be imposed on said output only when voltage is not supplied to said first input so that voltage will be supplied to said hot terminal of said signal means to generate a warning signal only when said headlight switch is closed to supply voltage to said second input and said ignition switch is open to not supply voltage to said first input.

3,905,014
POWER SUPPLY WARNING DEVICE FOR MARINE AND LAND VEHICLES

Thomas Judson Doench, Dayton, Ohio, assignor to Omnifac Corporation, Dayton, Ohio

Filed Apr. 18, 1974, Ser. No. 461,847
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—52 D **14 Claims**



1. For use in combination with a marine or land vehicle having a low voltage circuit powered from a low voltage power supply, propulsion means connected to the low voltage circuit, and a high voltage circuit for connection to an external standard domestic power supply, a power supply warning device comprising:

a. warning means connectable to one of said low voltage or said high voltage circuits, and

b. means operated by the other of said circuits in response to energization of said other circuit to connect said warning means to said one circuit to cause said warning means to warn against moving the vehicle when both said circuits are energized and to warn to disconnect the high voltage circuit from the external domestic power supply.

3,905,015
VEHICLE COLLISION DETECTING APPARATUS

Fumiyiki Inose, Kokubunji, and Takashiro Iwasaki, Kodaira, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 17, 1972, Ser. No. 235,752
Claims priority, application Japan, Mar. 17, 1971, 46-14406
Int. Cl. B60q *1/44*
U.S. Cl. 340—61 **6 Claims**

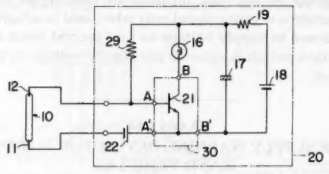
1. A vehicle collision detecting apparatus comprising:

a. a collision detecting element means fixedly mounted on the vehicle at a position at which deformation or strain of the vehicle body is likely to occur due to vehicle collision which comprises:

1. a substrate means constituted of fragile material for breaking in response to vehicle body deformation or strain as a result of collision;

2. two lead terminals fixed to said substrate means at mutually distant positions; and
3. means for providing an electrical conductive path between said terminals, said electrical conductive path means being a conductive material fixedly disposed with respect to said substrate means and being rendered non-conductive upon breaking of said substrate means; and

b. switching means for producing an on-off signal corresponding to conduction and non-conduction of the con-



ductive path between said lead terminals, said switching means including a magnet, a magnet member normally held in a stationary position by the attractive force of said magnet and made movable to a moving position according to the magnitude of impact of collision, a contact, to be closed when said magnetic member is moved to its moving position, a coil for producing a magnetic field superposed on the magnetic field of said magnet exerting said attractive force, and means for supplying current to said coil through said detecting element means.

3,905,016

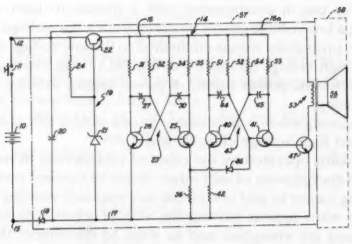
REVERSE SIGNAL ALARM SYSTEM

Carl J. Peterson, 4505 Koutenai, Boise, Idaho 83705

Filed Apr. 11, 1973, Ser. No. 350,169

Int. Cl.² B60Q 1/26

U.S. Cl. 340—70 **10 Claims**



1. An encapsulated solid state circuitry for a reverse signal alarm for a vehicle or the like which comprises: a first flip-flop circuit including a pair of transistors, each having a base, emitter and collector, the base of each of said transistors connected via a feed-back condensor to the collector of the other transistor and including resistances whereby the period of first flip-flop circuit is about one second; a second flip-flop circuit including a further pair of transistors each having a base, emitter and collector, the base of each of said further transistors connected via a feed-back condenser to the collector of the other said further transistors, and including further resistors whereby the period of said flip-flop circuit is about 900 – 1200 cycles per second; said pair and further pair of transistors each having the same industrial rating whereby they are interchangeable in the circuitry diode means only in a circuit connecting the emitter of one of said transistors in said first flip-flop circuit with a base of a further transistor in said second flip-flop circuit whereby said second flip-flop circuit is inoperative for about one-half of the cycle of said first flip-flop circuit, speaker means including a circuit having a control transistor in series therewith, said control transistor amplifying current by a factor of one hundred or better and having its base connected to the emitter of a said further transistor in said second flip-flop circuit whereby said speaker operates at about 900 – 1200 cycles per second for successive constant periods of about one-half second; said circuit of said speaker means, said first flip-flop circuit, and said second flip-flop circuit being connected in parallel for connection to a direct current source, switch means connecting said current source into said circuitry whereby when said switch means is opened voltage is not applied in said circuitry, means in the vehicle on the like sensing that it is in operative condition to proceed in a reverse direction for closing said switch means, and further diode means included in series in said circuitry between the connection of said circuits and said switch means connection of said direct current serving to prevent application of reverse polarity to said circuits whereby the system is inoperable if reverse polarity is applied thereto, the circuitry being entirely encapsulated except leads to said current source.

3,905,017

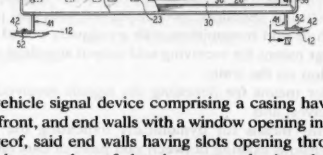
VEHICLE SIGNAL WITH THROUGH CASING BRACKETS

Herb G. Samra, 1606 N. 74th Ct., Elmwood Park, Ill. 60635

Filed July 1, 1974, Ser. No. 484,764

Int. Cl.² B60Q 1/32

U.S. Cl. 340—95 **21 Claims**



1. A vehicle signal device comprising a casing having top, bottom, front, and end walls with a window opening in the rear side thereof, said end walls having slots opening through the top and bottom thereof, bracket means having slotted leg portions extending into said end walls slots, and fasteners extending through the end walls and slots of the bracket means for clamping the end walls on the bracket means to fixedly mount the casing in an adjusted position relative to the bracket means so that the window opening can be accurately positioned relative to a vehicle.

3,905,018

BINARY IMAGE PROCESSOR

Stephen B. Gray, Santa Monica, Calif., assignor to Information International, Inc., Culver City, Calif.

Continuation-in-part of Ser. No. 48,124, June 22, 1970, Pat. No. 3,706,071. This application Sept. 15, 1972, Ser. No. 289,326

Int. Cl. G06k 9/08

U.S. Cl. 340—146.3 MA **9 Claims**

1. In apparatus for analyzing unknown images represented by binary data stored in a memory, an image processor comprising:

an unknown image data register for holding a plurality of bits comprising a portion of said unknown image data;

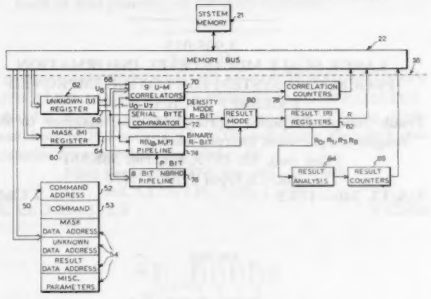
a result image data register;

a mask image data register for holding a plurality of bits comprising a portion of mask image data stored in said memory;

means for successively arithmetically comparing the magnitude of corresponding multiple bit bytes in said unknown and mask image data registers for generating a result bit in response to each comparison having a first value when said unknown data byte has a magnitude greater than said

mask data byte and a second value when said mask data byte has a magnitude greater than or equal to said unknown data byte;

means for successively entering said result bits into said result image data register;



means for entering successive portions of said unknown and mask image data stored in said memory into said unknown and mask image data registers, respectively; and means for successively storing in said memory data from said result data register to thereby generate in said memory an array of data representing a result image which is a preselected logical modification of said unknown image.

3,905,019

PATTERN RECOGNIZING OPTICAL APPARATUS

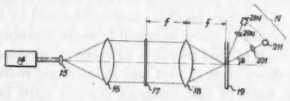
Harumi Aoki; Masahide Inoue, and Harumi Kawasaki, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1973, Ser. No. 411,673

Claims priority, application Japan, Nov. 2, 1972, 47-110062

Int. Cl.[2] G06K *9/08*

U.S. Cl. 340—146.3 P **7 Claims**



1. In an optical reader, optical means for directing light through an input pattern extending across an optical axis of said optical means and for providing an input pattern spectrum of the input pattern at a given plane, spatial filter means situated at said plane for providing a diffraction image corresponding to the input pattern, said spatial filter means being in the form of a hologram which has been exposed at a point which receives the input pattern spectrum to a pair of intersecting light beams one of which extends along the optical axis and the other of which is at a predetermined angle with respect to said axis with the light beams passing through a mask contacting the surface of the hologram prior to development thereof and having a transmission function which determines the transmission function of the spatial filter means formed by the hologram, and photosensitive detecting means situated at the side of said spatial filter means opposite from said optical means along an axis extending at said predetermined angle through the point of the hologram exposed to said light beams for responding to the diffraction image to provide a signal capable of identifying the input pattern, said hologram which forms the spatial filter means having been exposed at said point sequentially not only to a light beam extending along the optical axis but also to a plurality of light beams respectively extending at different angles with different masks being used to provide different transmission functions so that the spatial filter means has a plurality of different transmission functions respectively extending along a plurality of axes corresponding to the angles of the light beams which extend across the optical axis at a point of the hologram which is exposed prior to development thereof, and a plurality of said photosensitive means respectively situated along said axes at said different angles for responding to diffraction images extending along said axes to identify the input pattern.

3,905,020

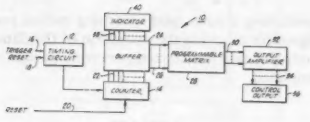
PROGRAMMABLE SOLID STATE SWITCH

Marion D. Knox, Oklahoma City, Okla., assignor to Wayne Electronic Products Co., Oklahoma City, Okla.

Filed Feb. 4, 1974, Ser. No. 439,567

Int. Cl.[2] H04Q *5/00*

U.S. Cl. 340—147 P **11 Claims**



1. A timing circuit for selectively providing one or more output control pulses in predetermined time relationship, comprising:

timing means for generating a series of sequentially output trigger pulses;

decimal counter means actuated by input of said trigger pulses to provide a pulse output sequentially at each of the plural stages;

buffer means including plural reactance means each connected to be energized by selected one of said counter means plural pulse outputs, and each generating a corresponding output pulse only while being energized;

programmable means having plural inputs each connected to receive a respective output pulse from each said buffer means, and having plural outputs each capable of being conductively coupled to selected ones of said programmable matrix means plural inputs; and

one or more output control means controlled by selected ones of said programmable matrix means plural outputs.

3,905,021

CIRCUIT ARRANGEMENT FOR INTERPRETING THE CONTENT OF A REGISTER AS AN INSTRUCTION

Friedrich Klein, Rothenbach, Peg, Germany, assignor to Diehl datensysteme G.m.b.H., Nurnberg, Germany

Filed Jan. 12, 1973, Ser. No. 323,269

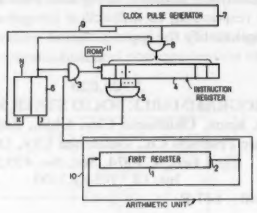
Claims priority, application Germany, Jan. 14, 1972, 2201754

Int. Cl.[2] G06F *9/06*

U.S. Cl. 340—172.5 **5 Claims**

1. For use in a data processing apparatus including a read-only memory and a first register, a circuit arrangement for interpreting at least part of the current content of the first register as an instruction, the circuit arrangement comprising, in combination: an instruction shift register having a plurality of stages and connected to the read-only memory; recognition means coupled to selected stages of said instruction register for comparing data currently stored in said selected stages of said instruction register for producing an output signal whenever said data indicates that said at least part of the current content of said first register is to be interpreted as an instruction; switching means connected to the output of said recognition means for producing a signal enabling such part of the content of said first register to be transferred to said instruction register in response to said output signal of said recognition means; and transfer means connected to said switching

means and connected between an output of said first register and an input of said instruction register for causing such part of the content of said first register to be transferred to said instruction register in response to the production of said signal



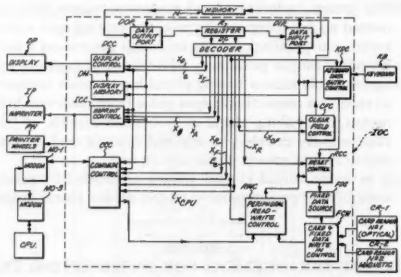
by said switching means; said switching means providing an output signal for blocking the operation of the data processor under control of said transferred part content until such transfer is completed.

3,905,022

DATA ENTRY TERMINAL HAVING DATA CORRECTION MEANS

John Patrick Klosky, Mentor, and James Lucian Maynard, Northfield, both of Ohio, assignors to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 26, 1973, Ser. No. 373,777
Int. Cl. G06f *1/00, 13/00*
U.S. Cl. 340—172.5 **14 Claims**



1. A data entry terminal comprising:

content addressable memory means for storing a variable length message comprised of data characters entered therein and including at least one variable character length data field and a field separator;

data entry means for entering a said message into said memory means so that said message includes at least one said variable character length data field and a said field separator;

means for outputting a said message from said memory means in such a manner that the data characters are outputted in a series sequence in the order in which they were entered into said memory means and such that a said field separator precedes the first entered character in an associated variable character length data field;

means for re-entering a said outputted message into said memory means and including controllable gating means for passing data characters to be re-entered into said memory means in a said series sequence;

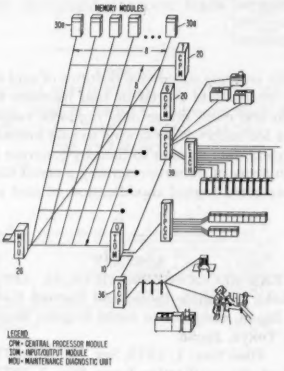
message modifying means for deleting from a said outputted message the data characters in the last entered data field in repsonse to a clear command signal and including gate control means for controlling said controllable gating means to prevent re-entry of the last entered character in the last entered data field each time a said outputted message is re-entered into said memory means and independently of the character length of said data field until all of said data characters in said data field have been deleted from said message.

3,905,023

LARGE SCALE MULTI-LEVEL INFORMATION PROCESSING SYSTEM EMPLOYING IMPROVED FAILSAFT TECHNIQUES

Frank Joseph Perpiglia, Springfield, Pa., assignor to Burroughs Corporation, Detroit, Mich.

Filed Aug. 15, 1973, Ser. No. 388,551
Int. Cl. G06f *11/06, 15/16*
U.S. Cl. 340—172.5 **2 Claims**



1. A multi-processing modular data processing system including a plurality of peripheral devices comprising:

a plurality of memory modules interconnected by a memory bus to provide a multi-accessable main memory for said system, each of said plurality of memory modules including a memory control unit and at least one memory storage unit, each of said memory control units being connected to said memory bus and including means for detecting errors in the transfer of information between said memory bus and said memory storage unit;

a plurality of central processing modules, each of said plurality of central processing modules including a program control section and a storage section, each of said storage sections being connected to said memory bus and including means for indicating malfunctions internal to said respective processing module and errors related to information transfer between said respective processing module and said main memory;

a plurality of input/output modules, each of said input/output modules including a memory interface unit and a translator unit, said memory interface unit of each of said plurality of input/output modules being connected to said memory bus, said translator unit of each of said plurality of input/output modules being connected to said program control section of each of said processing modules for receiving control information and including means for detecting and reporting malfunctions internal to said respective input/output module and errors related to information transfers between said respective input/output module and said plurality of peripheral devices;

a maintenance bus coupled to each of said memory control units of said plurality of memory modules and to each of said storage sections of said plurality of central processing

modules and to each of said memory interface units of said plurality of input/output modules; and

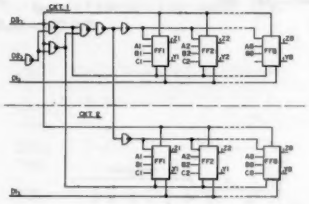
maintenance diagnostic means coupled to said maintenance bus for off-line testing of each of said plurality of said central processing modules, each of said plurality of input/output modules, and said memory control units of each of said plurality of memory modules;

3,905,024

CONTROL OF DEVICES USED AS COMPUTER MEMORY AND ALSO ACCESSED BY PERIPHERAL APPARATUS

Richard A. Boucek, Clarendon Hills, and John S. Young, Addison, both of Ill., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Sept. 14, 1973, Ser. No. 397,568
Int. Cl.[2] G11C *7/00, 11/40*
U.S. Cl. 340—172.5 **1 Claim**



1. A word store coupled to a computer and to a peripheral unit, said word store comprising:

at least one circuit comprising a plurality of dual access matrix points, each matrix point being a bistable device having a first clock input, a first data input, a second data input, a second clock input, a first output, a second output, a first gating input, and a second gating input;

said word store having a common clock input coupled to said first clock inputs, a first common gating input coupled to said first gating input, and a second common gating input coupled to said second gating inputs;

said computer is coupled to said common clock input, said first data inputs, said first common gating input, and said first outputs;

said peripheral unit is coupled to said second clock inputs, said second data inputs, said second common gating input, and said second outputs;

said computer including means to modify one or more bits of a data word stored in said word store including means to read the entire data word coupled to said first common gating input so that the data word appears at said first outputs, means to modify the selected bits in the computer, and means to write the entire word back by placing the data at said first data inputs and including means supplying a clock signal at said common clock input, said read-modify-write operation having a predetermined maximum clock pulse interval; and

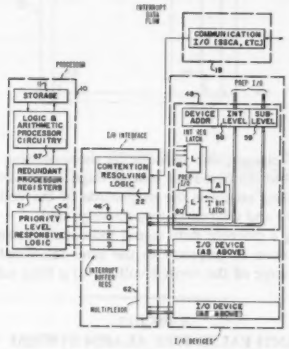
said peripheral unit including means to set one or more of said bistable devices to selected states in said word store by placing data at said second data inputs and including means supplying a clock pulse at said second clock inputs of only the selected devices, said clock pulses from said peripheral unit having a fixed predetermined maximum clock pulse interval greater than said computer read-modify-write clock pulse interval to make the state selected by the peripheral unit effective when both the computer and peripheral unit access said word store simultaneously with overlapping operation.

3,905,025

DATA ACQUISITION AND CONTROL SYSTEM INCLUDING DYNAMIC INTERRUPT CAPABILITY

Michael I. Davis; John M. Loffredo; Larry E. Wise, and Patrick L. Rickard, all of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 194,075, Oct. 27, 1971. This application Apr. 16, 1974, Ser. No. 461,337
Int. Cl.[2] G06F *3/00*
U.S. Cl. 340—172.5 **14 Claims**



1. A data processor system for responding to service request signals from attached sources so as to perform data processing tasks based upon a hierarchy of priority levels, said system comprising

addressable storage means,

logic circuitry for performing data processing operations including arithmetic and logical manipulations and data exchanges with said storage means,

a plurality of control circuit groups each allocated to a respective priority level in the hierarchy and each capable of controlling the operation of said logic circuitry independent of the other of said groups,

each said group including a plurality of registers sufficient to complete a central processing unit configuration in conjunction with said storage means and said logic circuitry, and

means responsive to service request signals having priority level identification associated therewith for actuating only the said control circuit group corresponding to the priority level of the highest priority service request signal present and for deactuating all other said control circuit groups,

whereby control of said logic circuitry will be granted to the actuated highest priority control circuit group regardless of the presence of service request signals of lower ordered priority levels.

3,905,026

LARGE, HIGH SPEED TWO DIMENSIONAL CORE MEMORY

Victor L. Sell, Santa Monica, Calif., assignor to Ampex Corporation, Redwood City, Calif.

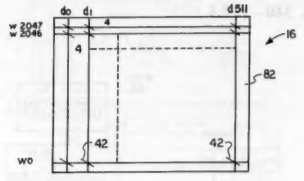
Filed Nov. 15, 1973, Ser. No. 416,097
Int. Cl. G11c *5/08, 11/06*
U.S. Cl. 340—174 PA **31 Claims**

27. The method of storing more than two information states in a toroid shaped core of homogeneous magnetic material comprising the steps of:

inductively switching a selected discrete portion of the flux in a toroid having substantially all of the permanent flux therein preswitched to a first magnetic state to a second

magnetic state opposite the first state, the selected discrete portion of the flux being one of at least three different available discrete flux portions and being selected in response to a discrete data signal;

switching substantially all of the flux in the core to the first state with a current inductively coupling the core which has a predetermined amplitude waveform;



sensing a voltage pulse induced by the switching of flux in the core to the first state, said voltage pulse having initial and trailing edges as the magnitude of the voltage pulse increases and decreases respectively; and

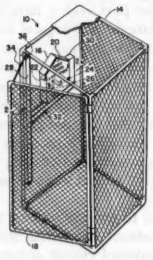
generating a discrete data signal indicating a stored information state in response to the time relationship of the trailing edge of the sensed voltage to a time reference.

3,905,027

ANTI-FALSE FIRE ALARM SYSTEM

James McWilliams, Oak Hill Rd., Baltimore, Md. 21239

Filed Dec. 26, 1974, Ser. No. 536,652
Int. Cl.[2] G08B *25/00*
U.S. Cl. 340—304 **12 Claims**



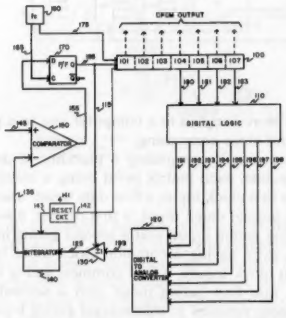
1. In an alarm system having an enclosure with a gate, an alarm within the enclosure, means for locking the gate in closed position on acuation of the alarm, and means for unlocking the gate from the exterior of the enclosure, the improvement comprising: first and second vertical guides secured to the enclosure, a horizontal guide secured between portions of the vertical guides, an alarm box proximate the horizontal guide and having an opening communicating therewith, a slider associated with the first vertical guide, means for operatively connecting the slider with the gate for causing the slider to travel between a gate-open position and a gate-closed position, the slider having a transverse aperture therein in position for alignment with the horizontal guide at the gate-closed position, a horizontal plunger in the horizontal guide having first and second ends, the first end proportioned for entering the slider transverse aperture, means biasing the horizontal plunger away from the slider transverse aperture, the alarm box having a door with cam fixed thereon, the horizontal plunger having a cam follower lever positioned for operative contact with the cam through the alarm box opening, whereby the horizontal plunger first end is forced into the slider aperture on opening the door of the alarm box, a keep within the second vertical guide positioned to descend and contact a portion of the horizontal plunger and prevent retraction thereof from the slider aperture, locking the gate; and a lock operatively associated with the keep in position to raise the keep and release the horizontal plunger from the slider transverse aperture, releasing the gate.

3,905,028

DIRECT DIGITAL LOGARITHMIC ENCODER

Paul A. Wintz, Lafayette, Ind.; John R. Sergo, Jr., Delaware, and Ching-Long Song, Columbus, both of Ohio, assignors to North Electric Company, Galion, Ohio

Filed Aug. 2, 1973, Ser. No. 385,095
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 AD **21 Claims**



1. In an apparatus for continuously tracking and digitally encoding a variable analog input signal according to a logarithmic encoding scheme in which a plurality of chords, each having a plurality of steps is defined, input means over which said analog input signal is received, reference means for providing a predetermined reference signal, comparator means connected to said input means and said reference means for providing output signals indicating the difference in the relative value of said reference signal and said variable analog input signal, second means including a reversible counter means responsive to said output signals to selectively advance and decrease to provide a set of code signals which represent the step number, the chord number, and at least the sign of the chord number, signal processing means including a chord identifier circuit and a digital to analog converter operative to provide feedback signals of different values in response to the receipt of said code signals which represent different ones of said chord numbers and said output signal, the amplitude of which varies for different chords, each step in a chord having the same fixed amplitude, and means in said reference means

for summing the signals output from said signal processing means with said predetermined cumulative reference signal to thereby continuously provide a modified reference signal to said first means to allow for continuous tracking and digital encoding of said variable analog input signal according to a logarithmic encoding scheme, and output means for deriving encoded digital signals from said reversible counter means at periodic intervals.

3,905,029

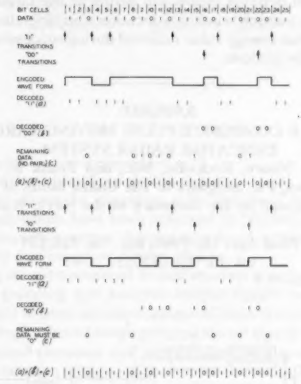
METHOD AND APPARATUS FOR ENCODING AND DECODING DIGITAL DATA

Duane E. McIntosh, Santa Ynez, Calif., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 292,141, Sept. 26, 1972, abandoned, which is a continuation of Ser. No. 94,032, Dec. 1, 1970, abandoned. This application Oct. 9, 1973, Ser. No. 404,231

Int. Cl.² H03K *13/00*; **H04L** *3/00*

U.S. Cl. 340—347 DD **32 Claims**



1. Apparatus for encoding binary data comprising:

clock means for forming a plurality of bit cells of substantially uniform time durations and for indentifying the boundaries of and middle of each bit cell,

logic means responsive to the state of two adjacent bits of said binary data and to said clock means for providing a bistable output signal containing transitions between the separately identifiable states of said output signal at one of the boundaries or at the middle of a selected one of the two bit cells containing said adjacent bits to identify the state of the two adjacent bits of data, said logic means responding to a first pair of adjacent bits forming one of the four possible two bit configurations by producing a transition at said one of the boundaries of said selected one of the bit cells unless said selected bit cell is preceded by a bit cell containing a transition at the middle or at said one of the boundaries thereof, said logic means responding to a second pair of adjacent bits forming a second of the four possible two bit configurations, the second bit of which is the complement of the second bit of said first pair of adjacent bits by producing a transition at the middle of said selected bit cell unless said selected bit cell is preceded by a bit cell containing a transition at the middle or at one of said boundaries thereof whereby each transition encodes two bits of data and successive transitions are separated by at least 1½ bit cells.

3,905,030

DIGITAL SOURCE OF PERIODIC SIGNALS

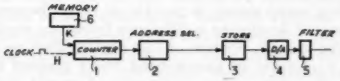
Pierre Lavanant, Lannion, and Jean-Baptiste Jacob, Saint-Quay-Perros, both of France, assignors to Societe Lannionnaise d'Electronique and Compagnie Industrielle des Telecommunications Cit-Alcatel, both of Paris, France

Filed July 19, 1971, Ser. No. 163,607

Claims priority, application France, July 17, 1970, 70.26552

Int. Cl.² H03K *13/00*; **H04L** *3/00*; **H04M** *1/45*

U.S. Cl. 340—347 DA **14 Claims**



1. A digital source of periodic signals of different frequency comprising a store containing a set of values defining the signal value of a basic signal at predetermined points in the signal period, sampling means for sampling selected values of the basic signal in the store content at least twice in each signal period including digital means for forming an address code for each sampled value, and an output circuit connected to the output of said store comprising a digital-to-analogue converter and a filter in series.

3,905,031

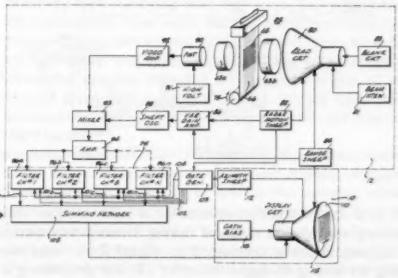
DATA PROCESSOR FOR A DOPPLER RADAR MAPPING SYSTEM USING A SYNTHESIZED ANTENNA ARRAY

Henry L. McCord, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed June 8, 1964, Ser. No. 374,236

Int. Cl.² G01S *7/06, 9/02, 9/44*

U.S. Cl. 343—5 CM **13 Claims**



12. A focused mapping system operable to map a range interval from a craft moving in azimuth relative to objects being mapped comprising, in combination, coherent radar means for developing a plurality of frequency varying Doppler signals having frequency and time characteristics representative of the position of the moving craft; means for recording said Doppler signals received over said range interval in the form of parallel line traces along the range dimension, the

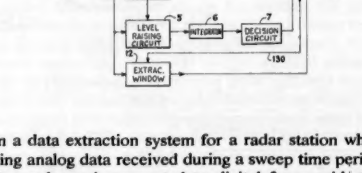
information from each range forming separable range elements; reading means coupled to said recording means for sequentially scanning successive range elements to develop Doppler history signals; control means coupled to said reading means for developing a first sweep signal having a duration so said reading means scans a portion of said traces in a direction substantially orthogonal thereto to form a range element and for developing a second sweep signal so said reading means sequentially scans successive range element for developing informational signals having frequency components proportional to the recorded Doppler signals; mixing means coupled to said reading means; swept oscillator means coupled to said mixing means; variable gain means coupled to said swept oscillator means and to said control means, said variable gain means being responsive to said first and second sweep signals to develop a reference frequency function having a predetermined rate of change of frequency during each of said first sweep signals, said predetermined rate during any one of said first sweep signals being different from the preceding and succeeding sweep signals to provide all range focusing, said mixing means developing a difference frequency representative of the azimuth position of said objects; filter means including a plurality of narrow-band filters coupled to said mixing means for passing predetermined spaced apart frequency bands of said difference frequencies; detector means coupled to each of said narrow-band filters for developing display signals in response to components of said difference frequency falling within said spaced apart frequency bands being passed through said filter means; output means including a cathode ray tube, means for deflecting the electron beam thereof in synchronism with said reading means, and means for intensity modulating said electron beam; and switching means coupled between said output means and said detector means for commutating display signals to the intensity modulating means of said output means to develop a two-dimensional indication of the objects within said area being mapped.

3,905,032

DATA EXTRACTION, PARTICULARLY DATA EXTRACTION FOR RADAR STATIONS

Yves Truel, and Daniel Beaufils, both of Paris, France, assignors to Thomson-CSF Visualisation et Traitement des Informations T-VT, Paris, France

Filed July 6, 1971, Ser. No. 159,699
Claims priority, application France, July 9, 1970, 70.25569
Int. Cl.[2] G01S 9/02
U.S. Cl. 343—7.3 **11 Claims**



1. In a data extraction system for a radar station wherein incoming analog data received during a sweep time period of an antenna beam is converted to digital form, said station having an analog-to-digital encoder (2) for processing a received analog target signal into digital form, a dense area analyzer (4) and noise suppressor (3) including a level raising circuit (5) coupled to said encoder to partially eliminate noise in said encoder output, an integrator (6) coupled to said encoder output side to integrate the energy received during several repetition periods, a decision circuit (7) making a true or false target determination coupled to said integrator, and a tracking computer (13) providing the coordinates of a tracked target, the improvement therein comprising:

a. a data extraction device in said radar receiver connected on the one side to said analog-to-digital encoder and on the other side to said tracking computer, receiving therefrom data on suspected targets previously calculated;

b. a data extraction tracking window in the data extraction device including location defining means (45, 46), energy input integrating and comparing logic means connected to said analog-to-digital encoder, operatively controlling said location defining means, said enery input integrating and comparing logic means including a shift register (17) fed by said analog-to-digital encoder wherein the received video data in digital form progresses during a number of repetition periods, corresponding to the antenna beam width, a subtraction circuit (19) coupled to said shift register output side and an adder circuit (18) on said shift register input side also connected to said subtraction circuit (19) and, a second shift register (21) connected between said adder and subtraction circuits (18, 19) so that the output of the adder delivers for each distance quantum maximum signal ($\Sigma i\ j$) corresponding to the energy received from a target during the defined repetition time periods; and,

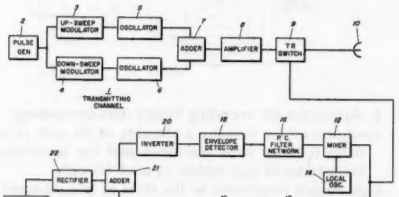
c. timing means associated with said data extraction device defining time quanta during which energy inputs to be integrated and compared are measured, whereby said location defining means will define as the target in said data extraction window a location corresponding to the maximum energy value received during successive repetition time periods.

3,905,033

SINGLE COMPOSITE PULSE MOVING TARGET INDICATOR RADAR SYSTEM

Thomas A. Moore, Rockville, Md., and Frank R. Castella, Norristown, Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 10, 1968, Ser. No. 721,137
Int. Cl.[2] G01S 9/233, 9/42
U.S. Cl. 343—7.7 **4 Claims**



1. A single composite pulse MTI radar system comprising in combination

means for transmitting single composite radar pulses of length T at a predetermined pulse repetition frequency, said pulses being simultaneously composed of a first component having a frequency sweep from f_1 to f_2 over the pulse length T and a second component having a frequency sweep from f_2 to f_1 over the pulse length T,

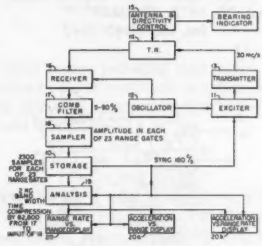
means for receiving target reflected pulses and for processing said pulses including a pair of pulse compression filter means for providing compressed pulses of said first and second pulse components in separate circuit paths, and

means for subtracting said processed pulses whereby a signal output is produced only for pulses reflected from moving targets.

3,905,034
RADAR SYSTEM

Garold K. Jensen, Pinecrest, Va., and James E. McGeogh, Silver Spring, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 31, 1963, Ser. No. 285,555
Int. Cl.² G01S *9/44*
U.S. Cl. 343—9 **4 Claims**



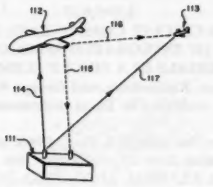
1. A radar system comprising:
transmitter means for emitting signals;
receiver means for receiving echo signals of said emitted signals which have been reflected by distant objects and for providing output doppler signals related in frequency to the movement of distant objects;
storage means connected to said receiver means for storing and grouping said receiver output signals in a manner related to predetermined ranges of distant objects and for playing back said range grouped stored signals in a predetermined sequence and with reduced time spacing therebetween;
oscillator means for producing a signal which rapidly varies in frequency in a manner related to the expected movement of a distant object and varies in frequency at a slower rate to be related in sequence to different range rates of the distant object;
heterodyning means connected to said storage means and to said oscillator means
whereby substantially constant frequency heterodyning means output signals are derived when said oscillator means frequency variations match the frequency variations in said doppler signals.

3,905,035
ELECTRONIC COUNTERMEASURE SYSTEM

Howard D. Krumboltz, Oreland, and Clayton W. Merrill, Wilmerding, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 31, 1966, Ser. No. 540,158
Int. Cl.² G01S *9/56;* **H04K** *3/00*
U.S. Cl. 343—6.5 R **16 Claims**

14. An airborne electronic countermeasure system for receiving and decoding radio frequency signals in a frequency band and transmitting decoded signals in reply to an interrogation, said system comprising:
a ground-based interrogator means;
a first aircraft friendly to said interrogator means having means for receiving interrogation signals from said interrogator means and responder means for transmitting to said interrogator means coded signals for identifying itself;
a second aircraft having means for intercepting and imitating said coded signals; and

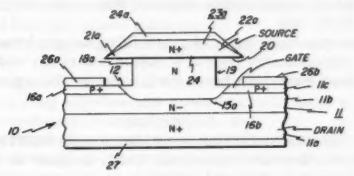


means within said second aircraft for transmitting reply signals to said interrogator means in response to said interrogation signals from said interrogator means, said reply signals having characteristics similar to said coded signals from said first aircraft, thereby causing said second aircraft to be identified as friendly in a hostile environment.

3,905,036
FIELD EFFECT TRANSISTOR DEVICES AND METHODS OF MAKING SAME

Herbert Goronkin, Dewitt, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 29, 1974, Ser. No. 455,974
Int. Cl.² H01L *29/80, 29/06*
U.S. Cl. 357—22 **7 Claims**



1. A field effect transistor comprising
a body of semiconductor material including a first layer of a first conductivity type, a second layer of said first conductivity type overlying said first layer, and a third layer of conductivity type opposite to said first conductivity type overlying said second layer, said third layer including an outwardly extending major surface and having an elongated opening exposing an elongated region of said second layer, the resistivity of said second layer being substantially higher than the resistivity of said first and third layers,
a projection of semiconductor material of said first conductivity type epitaxially grown on said expose elongated region of said second layer and in the opening of said third layer, said projection extending outward from the exposed surface of said third layer for a predetermined distance and thereafter extending substantially parallel to the exposed surface of said third layer to provide portions which laterally extend beyond the lateral positions of the long edges of the opening provided in said third layer, said projection of said first conductivity type forming a PN junction with said third layer of said second conductivity type, said projection including a first portion initially formed of a resistivity intermediate the resistivities of said first and second layers, and a second portion subsequently formed of a resistivity substantially the same as the resistivity of said first and third layers,

each of the exposed portions of said third layer and the outwardly extending face of said projection having a respective conductive layer thereon,

said second portion of said projection constituting a source region, said first layer of said body constituting a drain region and said third layer constituting a gate region.

3,905,037

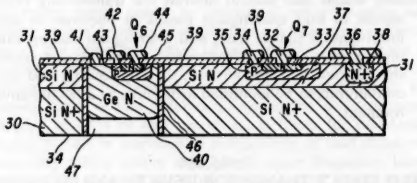
INTEGRATED CIRCUIT COMPONENTS IN INSULATED ISLANDS OF INTEGRATED SEMICONDUCTOR MATERIALS IN A SINGLE SUBSTRATE

Kenneth E. Bean, Richardson, and George R. Cronin, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 606,352, Dec., 1966, abandoned. This application June 11, 1969, Ser. No. 843,268

Int. Cl.[2] H01L *21/70, 27/02, 29/04*

U.S. Cl. 357—60 **4 Claims**



1. A semiconductor substrate for manufacturing an integrated circuit comprising:

a. at least two semiconductor regions of monocrystalline semiconductor material disposed so as to be closely spaced from each other and so as to have a common plane surface, the plane surfaces of said semiconductor regions lying in said common plane surface lying in parallel to crystal planes different from each other, respectively, and

b. an insulating material region filling the gap between said semiconductor regions to isolate electrically said regions from each other but unitarily combine the regions.

3,905,038

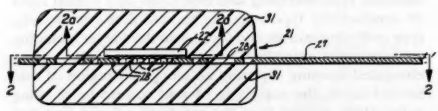
SEMICONDUCTOR ASSEMBLY AND METHOD

Fritz W. Beyerlein, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Feb. 26, 1973, Ser. No. 335,542

Int. Cl.[2] H01L *29/52*

U.S. Cl. 357—70 **21 Claims**



1. In a semiconductor assembly, mounting means and a package carried by the mounting means, said package comprising a semiconductor body having at least a portion of an electrical circuit formed therein with contact pads in a predetermined pattern carried by the body and lying in a common plane, a plurality of leads bonded to said contact pads, said leads extending outwardly from the semiconductor body and having outer extremities which lie exclusively in a single plane in a predetermined pattern, encapsulating means encapsulating said semiconductor body and the portions of said leads in engagement with said contact pads and so that the outer extremities of said leads are free of the encapsulating means and being readily accessible, said mounting means comprising a planar substrate having a planar surface, leads formed on said surface and having inner extremities forming at least one pattern corresponding to the pattern of the outer extremities of the leads of the package, said package being disposed so that it faces said planar surface of said substrate with the outer extremities of its leads overlying the inner extremities forming at least one pattern and means forming bonds between the outer extremities of the leads of the package and the inner extremities of the leads on said surface.

3,905,039

SYSTEM FOR BAND CONVERSION OF COLOR PICTURE SIGNAL

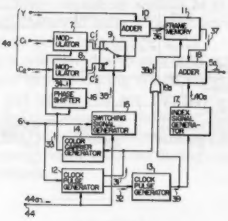
Yasufumi Yumde, and Takashi Furuhata, both of Yokohama, Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 12, 1973, Ser. No. 396,611

Claims priority, application Japan, Sept. 20, 1972, 47/93606; Sept. 20, 1972, 47/93607

Int. Cl.[2] H04N *9/42*

U.S. Cl. 358—11 **11 Claims**



1. A stationary color picture signal band conversion system for converting a simultaneous color picture signal of a wide band consisting of a luminance signal and two kinds of chrominance signals into a field sequential color picture signal of a narrow band, comprising:

memory means having the memory capacityy capable of storing a picture signal of one frame and capable of varying the writing speed and the reading speed;

means for switching two kinds of chrominance signals at every field period to selectively output them;

means for extracting a signal of one frame of a color picture signal;

means for supplying the two kinds of chrominance signals of the one frame of color picture signal extracted by the extracting means to the switching means and for writing one chrominance signal selected at one of the two field periods constituting the one frame together with the luminance signal at this field period in the memory means;

means for writing the other chrominance signal selected at the other field period together with the luminance signal at the latter field period in the memory means; and

means for reading the signals written in the memory means after completion of the writing at a speed lower than the writing speed to output them.

3,905,040

MAGNETIC DOMAIN STORAGE DISK

Matti Nillo Tapani Otala, Oulu, Finland, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 16, 1974, Ser. No. 433,821

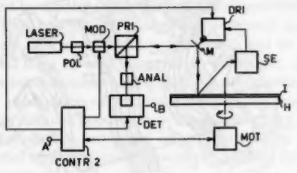
Claims priority, application Netherlands, Feb. 12, 1973, 7301932

Int. Cl.[2] G11B *7/02;* **G11C** *11/14*

U.S. Cl. 360—59 **9 Claims**

1. A storage system comprising a plate of magnetic material in which digital information can be stored in the form of domains, a plurality of magnetically active elements for determining a number of domain positions, write means from storing domains under the influence of thermal action of electro-

magnetic radiation, means for maintaining a magnetic bias field whose magnitude determines the domain dimension, the improvement wherein said plate is located on a rotatable disk, drive means for rotating said disk at a substantially uniform

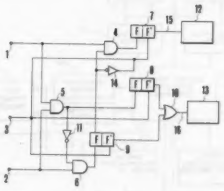


speed, said write means including read means for retrieving said information by electromagnetic radiation, and positioning members for selectively addressing the radial position of a domain on said disk.

3,905,041
OPERATING DEVICE FOR MAGNETIC RECORDING AND REPRODUCING APPARATUS

Kohichi Hase, Tokyo, Japan, assignor to Trio Electronics Incorporated, Tokyo, Japan

Filed Feb. 1, 1974, Ser. No. 438,638
Claims priority, application Japan, Feb. 6, 1973, 48-14886
Int. Cl. G11b *15/12*
U.S. Cl. 360—62 **3 Claims**

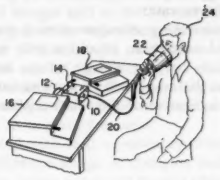


1. An operating device of a magnetic recording and reproducing apparatus comprising a first input line for receiving a recording operation signal, a second input line for receiving a constant speed running operation signal, a first output line for transmitting a recording-reproducing switching signal, a second output line for transmitting a constant speed running signal, means for producing said recording-reproducing signal and said constant speed running signal on said first and second output lines respectively, when said recording operation signal and said constant speed running operation signal are supplied simultaneously to said first and second input lines respectively, means for producing only said constant speed running signal on said second output line when said recording operation signal and said constant speed running operation signal are applied with a time difference to said first and second input lines respectively, means for producing only said recording-reproducing switching signal on said first output line when only said recording operation signal is applied to said first input line, means for producing only said constant speed running signal on said second output line when only said constant speed running signal is applied to said second input line, recording-reproducing switching means connected to said first output line and a constant speed running device connected to said second output line.

3,905,042
STENOGRAPHIC REMOTE CONTROL SYSTEM AND APPARATUS

Charles C. Johnson, Silver Spring, Md., assignor to Business Equipment Center Ltd., Washington, D.C.

Filed Mar. 23, 1973, Ser. No. 344,434
Int. Cl. G11b *15/10, 15/20, 19/16*
U.S. Cl. 360—71 **1 Claim**



1. In a system for recording the words of speakers wherein the system includes first and second recording units of a type including control means to move their respective recording mediums forward during a record mode, to reverse wind, playback, to start and stop, that improvement comprising

a stenographic face mask microphone into which an operator can speak without disturbing those in the vicinity and which speech develops an electrical output,

second control means on said face mask adapted to control said control means,

a first electrical conduit for transmitting the electrical output from said microphone,

a second electrical conduit for transmitting signals from said second control means,

a portable control unit having input terminals for receiving said first and second conduits,

first and second output terminals leading from said control unit,

first and second circuitries for electrically and respectively connecting said first and second recorder units to said first and second output terminals, and

switch means on said portable control unit for selectively and alternatively connecting the inputs from said first and second conduits to said first circuitry or said second circuitry.

3,905,043
TAPE TRACK-PLAYBACK HEAD ALIGNMENT ARRANGEMENT FOR A HELICAL SCAN VIDEO RECORDER

Egon Frank, Theisenort, Germany, assignor to Loewe-Opta GmbH, Berlin, Germany

Filed Apr. 2, 1973, Ser. No. 346,787
Claims priority, application Germany, Apr. 1, 1972, 2216077
Int. Cl.[2] G11B *21/10*
U.S. Cl. 360—77 **9 Claims**

1. In a helical scan video recorder adapted for reproducing video signals fixed on an oblique track disposed on an elongated magnetic tape at a relatively small inclination to the tape axis, wherein the recorder includes a drum rotatable about its axis and about which the tape is helically wrapped, a mechanical pick-up head rotatable in a scanning path with the periphery of the drum for detecting video signals recorded on the track, and means for longitudinally advancing the tape, an improved arrangement for correcting misalignments between the video track and the scanning path of the head in a direction parallel to the drum axis, which comprises:

modulating means cooperable with the tape advancing means for varying the rate of advance of the tape in a prescribed mechanical pattern determined by a command

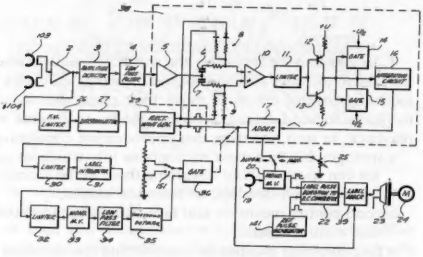
signal to effect the variation of the amplitude envelope of the video signal detected by the head;

means for generating a periodic control signal at a sub-audio rate;

pulse forming means having first and second inputs, the pulse forming means being arranged to generate a pulse upon the triggering of the first input thereof, the duration of such pulse being proportional to the magnitude of a voltage applied to the second input thereof;

means for triggering the first input of the pulse forming means at a sync rate;

means for converting nonsymmetrical variations of the video signal amplitude envelope into a unidirectional, monotonically varying voltage whose amplitude is proportional to the amplitude of such variations and whose polarity is indicative of the relative phase of such variations;



first adding means having first and second inputs;

means for applying the output of the converting means to the first input of the first adding means;

means for applying the periodic control signal to the second input of the first adding means;

means for coupling the output of the first adding means to the second input of the pulse forming means,

means coupled to the output of the pulse forming means for generating a DC error signal having an amplitude and polarity respectively indicative of the amplitude and sense of the deviation, with respect to a reference pulse duration, of the pulse duration of each pulse at the output of the pulse forming means;

second adding means having first and second inputs, the output of the second adding means defining the command signal;

means for applying the DC error signal to the first input of the second adding means; and

means for applying the periodic control signal to the second input of the second adding means.

3,905,044

MAGNETIC RECORD AND ERASE HEAD

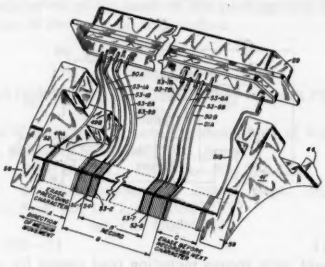
Joseph R. Andreaggi, Short Hills; Robert J. Graf, Newark, and Matthew J. Relis, Teaneck, all of N.J., assignors to Joseph R. Andreaggi, Short Hills, N.J.

Division of Ser. No. 250,872, May 8, 1972, Pat. No. 3,823,405. This application Dec. 28, 1973, Ser. No. 429,204

Int. Cl. G11b *5/20*

U.S. Cl. 360—122 **10 Claims**

1. A recording head comprising, an electrically conductive erase conductor having a plurality of aligned, actively conductive magnetic erasing surfaces, said erase conductor receiving an electrical signal for erasing a magnetizable surface opposite the active surfaces thereof, a plurality of individual, electrically conductive recording conductors positioned between different ones of said erasing surfaces and having active magnetic recording surfaces in substantial alignment with said erasing surfaces, said recording conductors receiving coded electrical signals for magnetically polarizing opposite areas of



the magnetizable surface in accordance with the code therefor.

3,905,045

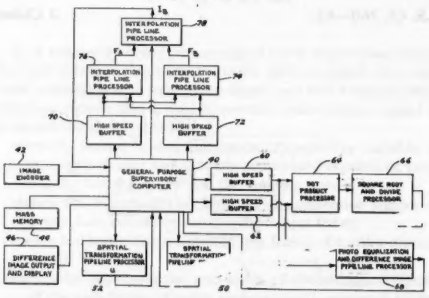
APPARATUS FOR IMAGE PROCESSING

Donald Francis Nickel, Bloomington, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed June 29, 1973, Ser. No. 375,301

Int. Cl.[2] **G06F** *15/06, 15/42;* **G03B** *41/16*

U.S. Cl. 444—1 **6 Claims**



1. Apparatus for producing a difference image, by sequential operation of a plurality of elements, from related subjects represented on a first and a second image, wherein said first and second images are represented by digitally encoded values representative of gray scale values in a predetermined gray scale range for a plurality of picture cells into which each of said images is divided, said apparatus comprising:

a supervisory computer for controlling the flow of digitally encoded data representative of images during the operation of said apparatus,

means connected with said supervisory computer for supplying encoded digital image data thereto representative of gray scale values on said first and second images,

means connected with said supervisory computer for providing mass memory storage capability for use by the elements of said apparatus as the elements thereof perform image processing steps in sequential order,

first and second spatial transformation processors, each connected to receive data from said supervisory computer and to transfer processed data to said supervisory computer, said data ultimately being retrieved from and returned to said means for providing a mass memory storage, said processors operating initially to perform an initial image warp transformation using operator selected match points on said first and second images, and which at a subsequent step in the sequence produces a final

image warp transformation using data calculated in steps subsequent to said initial image warp transformation,

a dot product processor connected to receive data from said supervisory computer, ultimately retrieved from said means for providing mass memory storage, said data resulting from said initial image warp transformation produced by said spatial transformation processors,

a square root and divide processor connected to receive data from said dot product processor and to transfer processed data to said supervisory computer, said data being re-introduced to said spatial transformation processors for production of said final image warp transformation data, said dot product processor and square root and divide processors providing image correlation data for said spatial transformation processors for said final image warp transformation,

a plurality of interpolation processors, connected to said supervisory computer, to receive data resulting from the final image warp transformation performed by said spatial transformation processors, said interpolation processors adapted to determine the gray scale values of transformed picture cells, at least one of said processors connected to receive data from said supervisory computer and at least one of said processors connected to transfer processed data to said supervisory computer,

a photo equalization and difference image processor connected to receive data from said supervisory computer and to transfer processed data to said supervisory computer, said processor to receive the data resulting from the operation of said interpolation processors and to simultaneously photo equalize one of said images with the other of said images and to mathematically determine a difference in gray scale values between one of said images and the other of said images on a picture cell by picture basis wherein one of the images has undergone image warp transformation and photo equalization with respect to the other so that the two picture cells are equivalent in image detail to one another, and

means connected with said supervisory computer for producing a difference image in operator usable form from the difference values produced by said photo equalization and difference image processor.

DESIGN PATENTS

GRANTED SEPTEMBER 9, 1975

ERRATA

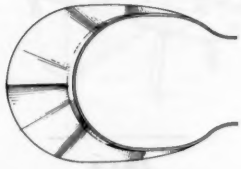
For CLASS	See PATENT NO.
010–106	236,719
019–059	236,729
019–059	236,730
019–059	236,731

DESIGNS

SEPTEMBER 9, 1975

236,660
SHIRT
Thomas A. Wilson, Cleveland, Ohio, assignor to American Greetings Corporation, Cleveland, Ohio
Filed July 30, 1973, Ser. No. 384,109
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—211

236,661
EYE SHADE
Charles V. Weaver, 18286 Clairmont Drive, South Bend, Ind. 46637
Filed Mar. 5, 1973, Ser. No. 338,148
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—247



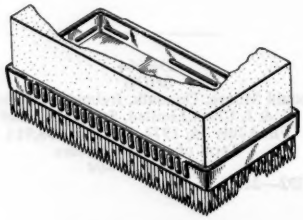
236,662
SHOE
Malcolm J. Cotton, Street, England, assignor to C. & J. Clark Limited, Street, England
Filed June 24, 1974, Ser. No. 482,018
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—268

236,663
SHOE
Malcolm J. Cotton, Street, England, assignor to C. & J. Clark Limited, Street, England
Filed June 24, 1974, Ser. No. 482,019
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—268

236,664
SHOE
Ronald Moore, Dundalk, Ireland, assignor to C. & J. Clark Limited, Street, England
Filed July 16, 1974, Ser. No. 488,911
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—268

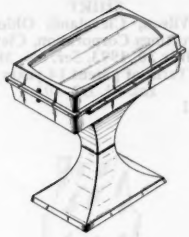
236,665
BOOT
Guy De Massacré, Paris, France, assignor to Hutchinson-Mapa, Paris, France
Filed Nov. 7, 1973, Ser. No. 413,679
Claims priority, application France May 28, 1973
Term of patent 3½ years
Int. Cl. D2—*04*
U.S. Cl. D2—275

236,666
COMBINED BRUSH AND SPONGE
Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11566
Continuation-in-part of design application Ser. No. 225,703, Feb. 11, 1972, now Patent No. 227,718. This application Apr. 30, 1973, Ser. No. 355,741
The term of this patent subsequent to July 17, 1987, has been disclaimed
Term of patent 14 years
Int. Cl. D4—*02*
U.S. Cl. D4—17



236,667
BEACH BACK REST
Carl Richard Mascaro, 24 Pelamaris, Ventura, Calif. 93003
Filed Nov. 15, 1973, Ser. No. 416,019
Term of patent 14 years
Int. Cl. D6—*99*
U.S. Cl. D6—1

236,668
MAKE-UP TABLE
Manus Mudde, Berkel-Enschot, Netherlands, assignor to Dart Industries Inc., Los Angeles, Calif.
Original design application Jan. 22, 1973, Ser. No. 325,916, now abandoned. Divided and this application Sept. 16, 1974, Ser. No. 506,473
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—27

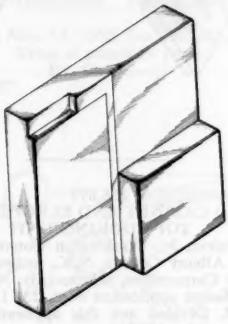


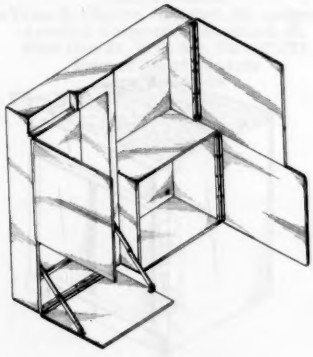
236,669
OUTDOOR BENCH
Frank D. Macy, Canby, Oreg., assignor to Tran-Sit Bench Systems Incorporated
Filed Sept. 4, 1973, Ser. No. 394,379
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—59

236,670
CHAIR
Tim M. Uyeda, South San Gabriel, Calif., assignor to Samsonite Corporation, Denver, Colo.
Filed Dec. 26, 1973, Ser. No. 427,846
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—66

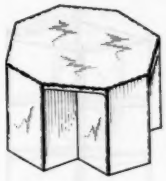
236,671
BED
Jaures Ponzoni, Via Aniceto Govi n. 19, Capri, Modena, Italy
Filed June 11, 1973, Ser. No. 368,630
Claims priority, application Italy Dec. 15, 1972
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—80

236,672
WALL HUNG STORAGE UNIT
Richard Kahn, 17 Diamond Drive, Plainview, N.Y. 11803
Filed Nov. 4, 1974, Ser. No. 520,938
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—127





236,673
COLLAPSIBLE TABLE
Ernst Ehrman, 400 E. 82nd St., New York, N.Y. 10028
Filed May 24, 1973, Ser. No. 363,660
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—146

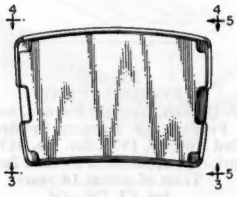


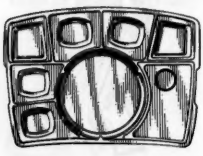
236,674
TABLE
Evalin S. Gilbert, 2121 N. Bay Shore Drive, Miami, Fla. 33137
Filed Nov. 20, 1972, Ser. No. 308,039
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

236,675
RECORD STAND
Arne P. Darnell, Urshult, Sweden, assignor to Perstorp AB, Perstorp, Sweden
Filed Nov. 19, 1973, Ser. No. 417,050
Claims priority, application Sweden June 7, 1973
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—185

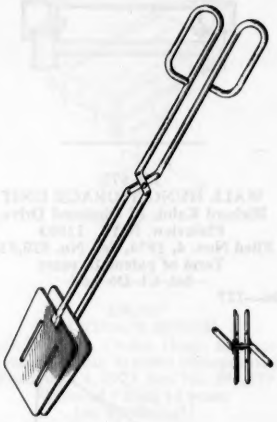
236,676
SHELF UNIT
Michael L. Urti, % Gibson Greeting Cards, Inc., 2100 Section Road, Cincinnati, Ohio 45237
Filed July 16, 1973, Ser. No. 379,217
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—186

236,677
FOOD SERVING TRAY
Nicholas J. Pilger, Thousand Oaks, Calif., and Jay Edward Ryan, Wheeling, Ill., assignors to American Hospital Supply Corporation
Filed Jan. 7, 1974, Ser. No. 431,153
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—38

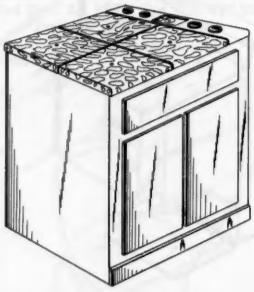




236,678
BARBECUE SPATULA
James A. Rader, Lamar, Mo., assignor to New World Bar-B-Q Accessories, Inc., Lamar, Mo.
Filed May 2, 2, 1974, Ser. No. 466,268
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—105



236,679
COMBINED CABINET AND ELECTRIC COUNTER TOP COOKING UNIT
Philip H. Peters, Jr., Washington County, and John L. Matrone, Albany County, N.Y., assignors to Environment/One Corporation, Schenectady, N.Y.
Original design application Sept. 23, 1971, Ser. No. 183,288. Divided and this application Nov. 21, 1973, Ser. No. 417,966
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—121



236,680
STEEL TAPE AND WIRE PULLER
Michael J. Jaques, 602 S. Hobson, Mesa, Ariz. 85204
Filed Apr. 18, 1974, Ser. No. 461,858
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—14

236,681
PAIR OF SCISSORS
Salvatore J. Megna, Sacramento, Calif., assignor to Professional Instruments, Incorporated, Cincinnati, Ohio
Filed Nov. 19, 1973, Ser. No. 417,040
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—57

236,682
ESCUTCHEON
La Verne E. Clayton, Rockford, Ill., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 26, 1973, Ser. No. 427,726
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—179

236,683
DOOR VIEWER PLATE
Raymond U. H. Tegner, Lodi, Wis., assignor to Amerock Corporation, Rockford, Ill.
Filed Dec. 26, 1973, Ser. No. 427,840
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—179

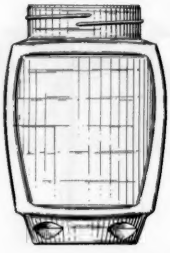
236,684
DISPENSER FOR LIQUIDS OR FLUIDIZED POWDERS
Peter Bruce Hebblethwaite, Ashford, England, assignor to Graviner (Colnbrook) Limited
Filed May 7, 1973, Ser. No. 358,093
Claims priority, application Great Britain Nov. 25, 1972
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—9

236,685
BOTTLE
Alan R. Tripp, New York, N.Y., assignor to Ventura Product Development Corp., New York, N.Y.
Filed Aug. 20, 1973, Ser. No. 389,485
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—56

236,686
COMBINED BOTTLE AND DISPENSING CAP
Herbert Ashley Atkins, Maidenhead, England, assignor to Beecham Group Limited, Brentford, England
Filed Aug. 15, 1972, Ser. No. 281,008
Claims priority, application Great Britain Feb. 21, 1972
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—130

236,687
JAR
Androus D. Noyes, Ossining, N.Y., assignor to General Foods Corporation, White Plains, N.Y.
Filed Mar. 13, 1974, Ser. No. 450,624
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—142

236,688
JAR
Carl J. McCaleb, Goshen, N.Y., assignor to General Foods Corporation, White Plains, N.Y.
Filed Mar. 13, 1974, Ser. No. 450,649
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—142



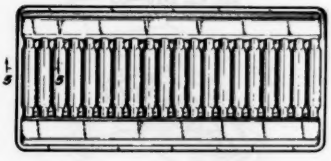
236,689
BOTTLE
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois, Inc.
Filed Nov. 19, 1973, Ser. No. 416,990
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—157

236,690
JAR
Manuel J. Oliveira, Woodcliff Lake, N.J., and Samuel E. Lanham, New York, N.Y., assignors to General Foods Corporation, White Plains, N.Y.
Filed Mar. 28, 1974, Ser. No. 455,682
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—163

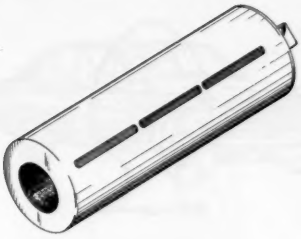
236,691
COVERED COMPARTMENTED FOOD TRAY
Donald Andrew Haase, Penfield, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Mar. 16, 1973, Ser. No. 342,224
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—185

236,692
COVERED COMPARTMENTED FOOD TRAY
Donald Andrew Haase, Penfield, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.
Filed Mar. 16, 1973, Ser. No. 342,240
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—185

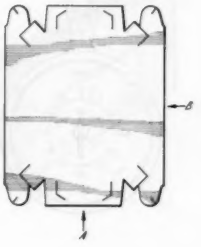
236,693
PACKAGING TRAY FOR CANDY
Richard Gibian, Box 879, Selma, Ala. 36701, and Maurice Bernard, 1247 Zonolite Road NE., Atlanta, Ga. 30306
Filed Feb. 22, 1973, Ser. No. 334,604
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—189



236,694
DEVELOPER MIX STORAGE CONTAINER
Donald R. Avolio, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.
Filed May 31, 1973, Ser. No. 365,809
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—216

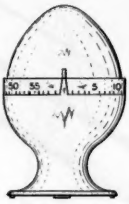


236,695
CARTON BLANK
Peter Ellice Elford, 3 Wincroft Road, Caversham, Reading RG4 7HH, England
Filed Sept. 21, 1973, Ser. No. 399,522
Claims priority, application Great Britain Mar. 28, 1973
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—245

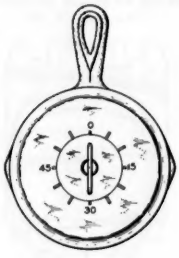


236,696
WALL CLOCK
James D. M. Green, 38 Neck Road, Ponte Vedra Beach, Fla. 32082, and Tom R. Turner, Jr., 4614 Rosemont Road, Jacksonville, Fla. 32207
Filed Dec. 12, 1973, Ser. No. 424,107
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—17

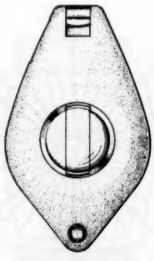
236,697
BELL TIMER
James A. Draghi, Canton, Conn., assignor to M. H. Rhodes, Inc., Avon, Conn.
Filed Apr. 12, 1974, Ser. No. 460,309
Term of patent 14 years
Int. Cl. D10—*03*
U.S. Cl. D10—40



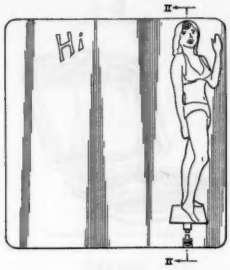
236,698
BELL TIMER
James A. Draghi, Canton, Conn., assignor to M. H. Rhodes, Inc., Avon, Conn.
Term of patent 14 years
Filed Apr. 12, 1974, Ser. No. 460,310
Int. Cl. D10—*03*
U.S. Cl. D10—40



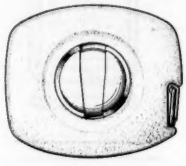
236,699
CHALK LINE REEL
Laird Fortune Covey, Easton, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Nov. 2, 1973, Ser. No. 412,470
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D10—61



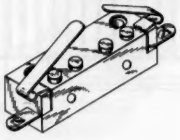
236,700
COMBINED TWO-WAY LEVEL AND NAMEPLATE FOR TRAILERS
Charles L. Geiger, 453 Elliot Road, Clairton, Pa. 15025
Filed Aug. 27, 1973, Ser. No. 391,965
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—69



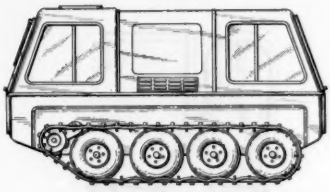
236,701
TAPE MEASURE
Laird Fortune Covey, Easton, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Dec. 12, 1973, Ser. No. 426,647
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—72



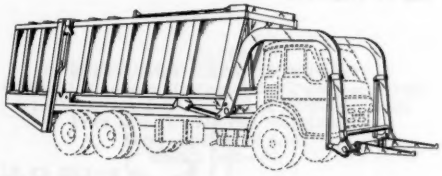
236,702
ELECTRICAL TERMINAL BLOCK FOR BURGLAR ALARM SYSTEM
Morton Cohen, Flushing, N.Y., assignor to Security Instruments, Inc., Bronx, N.Y.
Filed Dec. 13, 1972, Ser. No. 314,694
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



236,703
ALL-TERRAIN VEHICLE
Dwight C. Baker, 19633 SE. 29th St., Issaquah, Wash. 98027, and Arpad P. Augusztiny, 7603 S. Sunnycrest Road, Seattle, Wash. 98178
Filed Dec. 3, 1973, Ser. No. 421,313
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D12—1

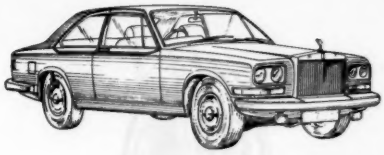


236,704
TRUCK BODY
Fred T. Smith, Dearborn Heights, Mich., assignor to Sargent Industries, Inc., Los Angeles, Calif.
Filed Dec. 28, 1973, Ser. No. 429,095
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—15

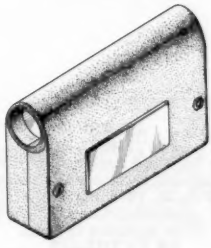


236,705
STOCK CART
Thomas R. Woeckener, 910 40th Ave., East Moline, Ill. 61244
Filed Mar. 4, 1974, Ser. No. 447,474
Term of patent 14 years
Int. Cl. D12—*02*
U.S. Cl. D12—26

236,706
AUTOMOBILE
Sergio Pininfarina, Turin, Italy, assignor to Rolls-Royce Motors Limited, Crewe, England
Filed Nov. 16, 1973, Ser. No. 416,494
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—92

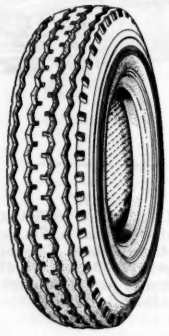


236,707
BICYCLE ELECTRICAL SYSTEM CONTAINER
Arthur M. Martin, Tampa, Fla., assignor to Needs, Incorporated, Tampa, Fla.
Filed Nov. 9, 1973, Ser. No. 414,463
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114



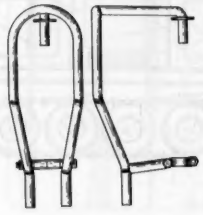
236,708
REFLECTIVE BICYCLE PEDAL
Hubert Joachim Konzorr, Unna, Westphalia, Germany, assignor to Union Sils, van de Loo & Co. Kom. Ges., Frondenberg, Germany
Filed Feb. 13, 1973, Ser. No. 332,157
Claims priority, application Germany Aug. 14, 1972
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—125

236,709
TIRE FOR A VEHICLE WHEEL
Arthur Sam Ravenhall, Solihull, England, assignor to Dunlop Limited
Filed Sept. 12, 1972, Ser. No. 288,438
Claims priority, application Great Britain Mar. 14, 1972
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—142

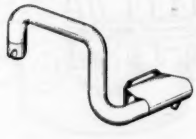


236,710
TIRE
David Lyndon Buck and Anthony Mark Mills, Sutton Coldfield, England, assignors to Dunlop Limited
Filed Feb. 26, 1973, Ser. No. 335,800
Claims priority, application Great Britain Sept. 1, 1972
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—144

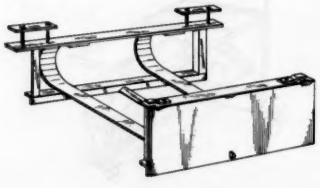
236,711
SAFETY DEVICE FOR MOTORCYCLE HANDLEBARS
Michael Christopher Burrett, 6376 Fielding Ave., Montreal 265, Quebec, Canada
Filed Sept. 27, 1972, Ser. No. 292,508
Claims priority, application Canada Apr. 4, 1972
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—155



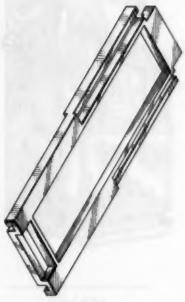
236,712
JACKETED EXHAUST PIPE FOR MARINE INTERNAL COMBUSTION ENGINES
Daniel E. Holliday, Sun Valley, Calif., assignor to Rotary Marine Corporation
Filed Feb. 11, 1974, Ser. No. 441,553
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—194



236,713
TIRE MOUNTING BRACKET FOR VEHICLES
Marvin G. Wertjes, 2118 Valley Park Drive, Cedar Falls, Iowa 50613
Filed May 31, 1974, Ser. No. 475,209
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—202



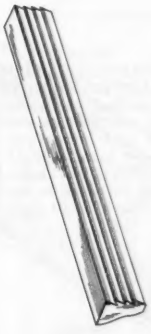
236,714
INTERLOCKABLE PANEL FOR A PETROLEUM TANK FLOATING LID
Irenie Mary Nayler, Bridgnorth, and Alan John Murray, Deux Hill, England, assignors to Nayler (Petroseals) Limited, Dudley, England
Filed Oct. 6, 1972, Ser. No. 295,465
Claims priority, application Great Britain Apr. 7, 1972
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—1 H



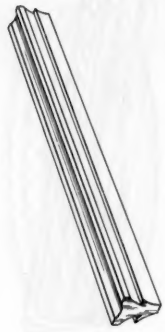
236,715
PREFOAMED EXPANSION JOINT
William J. Patterson, Burlington, Iowa, assignor to Midwest Manufacturing Corporation, Burlington, Iowa
Filed June 11, 1973, Ser. No. 368,647
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—6

236,716
PREFOAMED EXPANSION JOINT
William J. Patterson, Burlington, Iowa, assignor to Midwest Manufacturing Corporation, Burlington, Iowa
Filed Feb. 26, 1974, Ser. No. 454,944
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—6

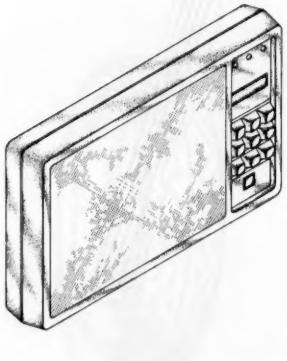
236,717
PREFOAMED EXPANSION JOINT
William J. Patterson, Burlington, Iowa, assignor to Midwest Manufacturing Corporation, Burlington, Iowa
Filed Mar. 26, 1974, Ser. No. 454,948
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—6



236,718
PREFOAMED EXPANSION JOINT
William J. Patterson, Burlington, Iowa assignor to Midwest Manufacturing Corporation, Burlington, Iowa
Filed Mar. 26, 1974, Ser. No. 454,962
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D13—6

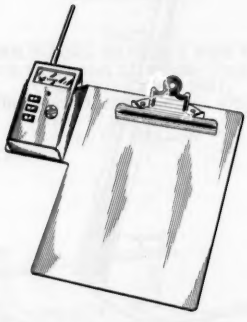


236,719
SECURITY CONSOLE
Walton E. Sparks, Lexington, Ohio, and Howard M. Meehan, Santa Ana, Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed May 3, 1974, Ser. No. 466,743
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—106



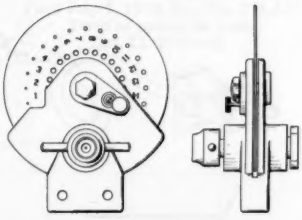
236,720
AUDIO-VISUAL PROJECTOR FOR CONVEYING INFORMATION
Mark P. Baker, P.O. Box 187, Beatty, Nev. 89003
Filed June 11, 1973, Ser. No. 368,770
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—60

236,721
COMBINED CLIP BOARD AND SOUND LEVEL METER
Alfred L. Stolberg, Rochester, N.Y., assignor to Metrosonics, Inc., Rochester, N.Y.
Filed May 23, 1973, Ser. No. 363,028
Term of patent 14 years
Int. Cl. D19—*99*
U.S. Cl. D19—88

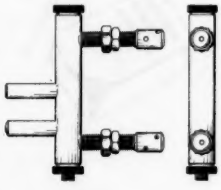


236,722
POLICE CLUB OR SIMILAR ARTICLE
Paul D. Starrett, Rindge, N.H., assignor to Monadnock Lifetime Products, Inc., Fitzwilliam, N.H.
Filed Nov. 8, 1973, Ser. No. 413,914
Term of patent 14 years
Int. Cl. D22—*02*
U.S. Cl. D22—1

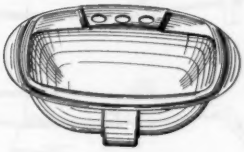
236,723
FLUID FLOW CONTROL
Edward D. Scheffler, Jr., Coloma, Mich., assignor to AG-Chem Equipment Co. Inc.
Filed Feb. 22, 1973, Ser. No. 334,617
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—1



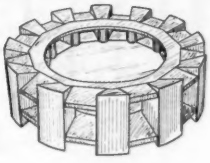
236,724
FLUID FLOW DIVIDER
Edward D. Scheffler, Jr., Coloma, and Laurence H. Fish, Benton Harbor, Mich., assignors to AG-Chem Equipment Co. Inc.
Filed Feb. 22, 1973, Ser. No. 334,620
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—40



236,725
LAVATORY
George H. Frost, 554 Ivan Drive, Kent, Ohio 44240
Filed Feb. 14, 1974, Ser. No. 442,477
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58

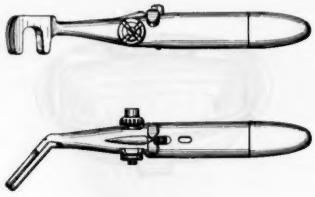


236,726
INJECTION NOZZLE RIM FOR VENTILATING APPARATUS
Jorgen Holt, Naestved, Denmark, assignor to Nordisk Ventilator Co. Aktieselskab
Filed June 20, 1972, Ser. No. 264,506
Claims priority, application Denmark Dec. 22, 1971
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—163

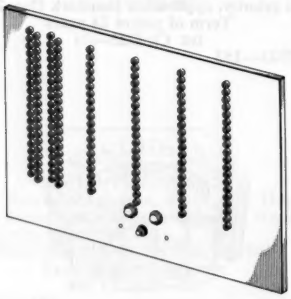


236,727
CURVED SURGICAL EXAMINATION MIRROR OR SIMILAR ARTICLE
Terry F. Tanner, 323 Snell Isle Blvd. NE., St. Petersburg, Fla. 33704
Original design application July 9, 1973, Ser. No. 377,729, now Design Patent No. 231,737. Divided and this application Nov. 2, 1973, Ser. No. 412,443
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—1 D

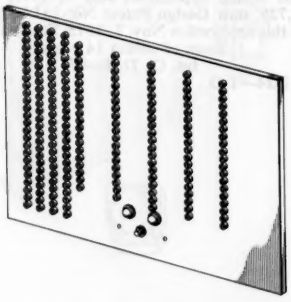
236,728
DENTAL FLOSS HOLDER OR SIMILAR ARTICLE
Jerrold B. Harris, 45 W. Sommerlyn Road, Colorado Springs, Colo. 80906
Filed July 12, 1974, Ser. No. 488,022
Term of patent 3½ years
Int. Cl. D24—*99*
U.S. Cl. D24—1 D



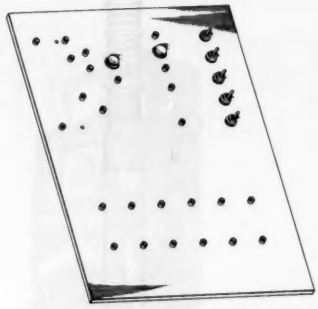
236,729
EDUCATIONAL PLUG-IN BOARD
Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.
Filed Apr. 20, 1973, Ser. No. 353,188
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—59



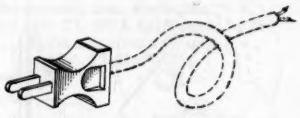
236,730
EDUCATIONAL PLUG-IN BOARD
Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.
Filed Apr. 20, 1973, Ser. No. 353,189
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—59



236,731
EDUCATIONAL PLUG-IN BOARD
Charles G. Valentine, Stamford, Conn., assignor to Xerox Corporation, Stamford, Conn.
Filed Apr. 27, 1973, Ser. No. 355,228
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—59

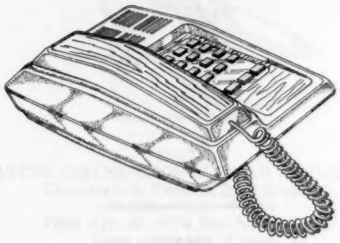


236,732
ELECTRICAL PLUG
Roger Cole, 93 Bleecker Drive, Newark, N.J. 07102
Filed Oct. 16, 1972, Ser. No. 297,891
Term of patent 3½ years
Int. Cl. D13—*03*
U.S. Cl. D26—1 A



236,733
CURSOR POSITION CONTROLLER
Carl J. Clement, Mountain View, William K. English, Portola Valley, and Fred H. Stengel, Palo Alto, Calif., assignors to Xerox Corporation, Stamford, Conn.
Filed Dec. 20, 1973, Ser. No. 426,848
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—13 C

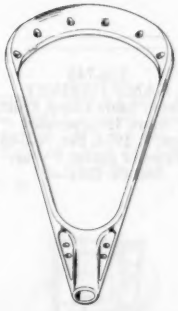
236,734
TELEPHONE HOUSING
Gerald Ray Daum, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.
Filed Nov. 4, 1974, Ser. No. 520,683
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



236,735
GOLF CLUB SHAFT OR SIMILAR ARTICLE
Robert R. Bush, North Madison, Ohio, assignor to True Temper Corporation, Cleveland, Ohio
Filed July 2, 1973, Ser. No. 375,447
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GS

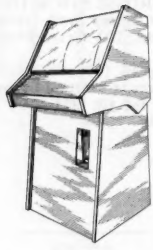
236,736
GOLF CLUB HEAD
Lloyd C. Winter, 1430 Cherrydale Drive, San Jose, Calif. 95125
Original design application Dec. 17, 1971, Ser. No. 209,510. Divided and this application July 16, 1973, Ser. No. 379,851
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

236,737
LACROSSE STICK HEAD
William H. Brine, 26 Gypsy Trail, Weston, Mass. 02193, and Peter J. Brine, 102 Great Plain Ave., Wellesley, Mass. 02181
Filed Aug. 20, 1973, Ser. No. 390,020
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

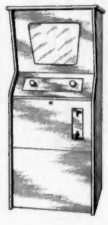


236,738
GAME CABINET
Regan L. Cheng, Oakland, and Peter L. Takaichi, San Jose, Calif., assignors to Atari, Incorporated
Filed Apr. 8, 1974, Ser. No. 459,014
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

236,739
GAME CABINET
George Faraco, Saratoga, Calif., assignor to Atari, Incorporated
Filed Apr. 8, 1974, Ser. No. 459,015
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

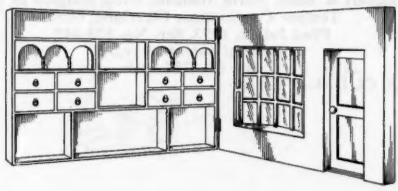


236,740
GAME CABINET
Nolan K. Bushnell, Santa Clara, Calif., assignor to Atari, Incorporated
Filed Apr. 8, 1974, Ser. No. 459,016
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J



236,741
ROLLER SKATE
Ralph L. Smith, 1431 Ocean Ave., Santa Monica, Calif. 90401
Filed Apr. 5, 1974, Ser. No. 458,196
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—14 C

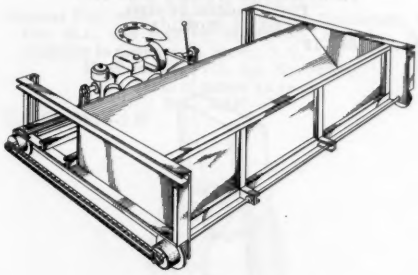
236,742
TOY SHOP FRONT AND SIDE
Christine Goodwin, 8 Wilton Place, London SW. 1, England
Filed Nov. 14, 1973, Ser. No. 415,734
Claims priority, application Great Britain July 30, 1973
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL



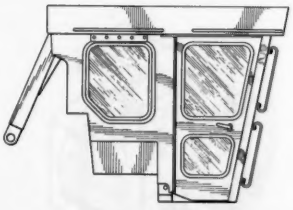
236,743
TOY COASTER
Matthew Moustakas, Mercerville, N.J., assignor to CBS Inc., New York, N.Y.
Filed Feb. 19, 1974, Ser. No. 443,232
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ

236,744
WATER SKI
Roderick P. Sharpe, 9440 Airport Blvd., Apt. C, Los Angeles, Calif. 90045
Filed Nov. 16, 1973, Ser. No. 416,388
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—40

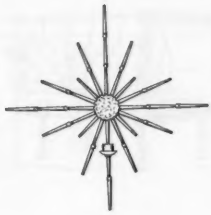
236,745
PAVING MACHINE OR SIMILAR APPARATUS
Constancio S. Fuentes, 2520 Everton, Lancaster, Tex. 75146
Filed Apr. 26, 1974, Ser. No. 464,314
Term of patent 14 years
Int. Cl. D15—*04*
U.S. Cl. D40—5



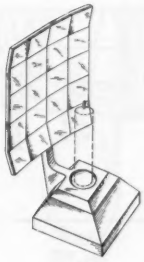
236,746
ROLLOVER PROTECTIVE CAB FOR TRACTOR
John D. Wait, Jr., Dunlap, Max E. Butterfield, Peoria, Richard Van Rossem, Canton, and Arthur E. Olt, Jr., Pekin, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Aug. 16, 1974, Ser. No. 498,040
Term of patent 14 years
Int. Cl. D15—*03, 04*
U.S. Cl. D40—5



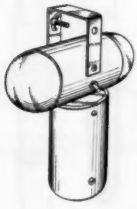
236,747
CANDLE HOLDING SCONCE OR THE LIKE
James D. M. Green, 38 Neck Road, Ponte Vedra Beach, Fla. 32082, and Tom R. Turner, Jr., 4614 Rosemont Road, Jacksonville, Fla. 32207
Filed Dec. 12, 1973, Ser. No. 424,108
Term of patent 14 years
Int. Cl. D26—*01*
U.S. Cl. D48—2



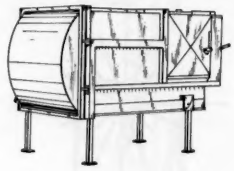
236,748
CANDLE HOLDER
Harry Scisorek, 53K Franklin Greens S., Somerset, N.J. 08873
Filed Mar. 4, 1974, Ser. No. 448,122
Term of patent 3½ years
Int. Cl. D26—*01*
U.S. Cl. D48—2



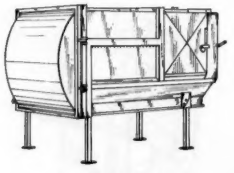
236,749
BATTERY OPERATED LAMP
Leslie E. Olsen, 1894 Locust St., Reno, Nev. 89502
Filed Sept. 7, 1973, Ser. No. 394,973
Term of patent 3½ years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R



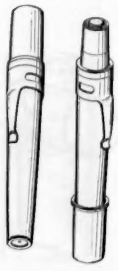
236,750
REFUSE PACKER
Stanley W. Worthington, 824 Clough, Waterloo, Iowa 50701
Filed May 24, 1973, Ser. No. 363,518
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D55—1 B



236,751
REFUSE PACKER
Stanley W. Worthington, 824 Clough, Waterloo, Iowa 50701
Filed May 24, 1973, Ser. No. 363,519
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D55—1 B

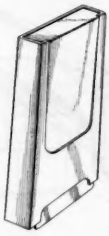


236,752
CYLINDRICAL STAMP
Takaji Funahashi, 1, 2-chome, Kitatakasho-machi, Nishi-ku, Nagoya-shi, Aichi-ken, Japan
Filed Nov. 9, 1973, Ser. No. 414,433
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10

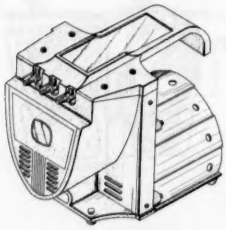


236,753
PHOTOGRAPHIC CAMERA
Claus Prochnow, Braunschweig, and Ernst Moeckel, Stuttgart, Germany, assignors to Rollei-Werke Franke & Heidecke
Filed Nov. 6, 1973, Ser. No. 414,617
Claims priority, application Germany May 9, 1973
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D1—1 B

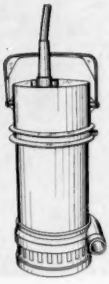
236,754
RECTANGULAR STAMP
Takaji Funahashi, 1, 2-chome, Kitatakasho-machi, Nishi-ku, Nagoya-shi, Aichi-ken, Japan
Filed Nov. 9, 1973, Ser. No. 414,432
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10



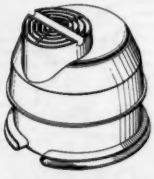
236,755
AIR-PUMP FOR AQUARIUM OR THE LIKE
Ryozo Kondo, 19–5, Ikegami 1-chome, Ota-ku, Tokyo, Japan
Filed Mar. 14, 1973, Ser. No. 341,283
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D65—1 R



236,756
SUBMERSIBLE PUMP
Ingemar Franzen, Pforzheim, Germany, assignor to ITT Industries, Inc., New York, N.Y.
Filed Feb. 14, 1974, Ser. No. 442,368
Claims priority, application Sweden Aug. 16, 1973
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D65—1 R

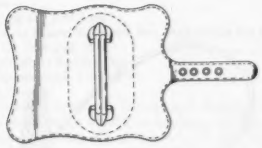


236,757
ICE CREAM FREEZER
Michael Lax, New York, N.Y., Robert Dziekonski, Fort Lee, N.J., and Paul M. Moskowitz, Brooklyn, N.Y., assignors to Salton, Inc., Bronx, N.Y.
Filed June 8, 1973, Ser. No. 368,067
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D67—2 R



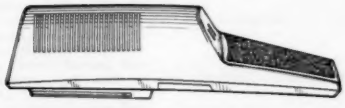
236,758
LUGGAGE
Pasquale R. Sollazzi, Newark, Del., assignor to Rapid-American Corporation, New York, N.Y.
Filed Apr. 30, 1973, Ser. No. 355,383
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 F

236,759
COMBINED LUGGAGE FLAP AND HANDLE
Pasquale R. Sollazzi, Newark, Del., assignor to Rapid-American Corporation, New York, N.Y.
Filed Apr. 30, 1973, Ser. No. 355,384
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5 R

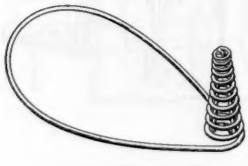


236,760
KEY HOLDER
Robert C. Brown, Sr., P.O. Box 1166, Vallejo, Calif. 94590
Filed July 16, 1973, Ser. No. 379,301
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—8

236,761
MIST HAIR STYLER
Norman A. Steinkamp, Chicago Heights, Ill., assignor to Sunbeam Corporation, Chicago, Ill.
Filed Jan. 14, 1974, Ser. No. 433,432
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 F



236,762
WIG STAND HOLDER FOR A VEHICLE SEAT
Palmer B. Peters, 2825 Knode St., Torrance, Calif. 90501
Filed Nov. 7, 1973, Ser. No. 413,530
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 A



236,763
HAND-HELD HAIR DRYER OR SIMILAR ARTICLE
Walter C. Anderson, West Redding, Conn., assignor to General Electric Company
Filed Apr. 1, 1974, Ser. No. 457,088
Term of patent 3½ years
Int. Cl. D28—*03*
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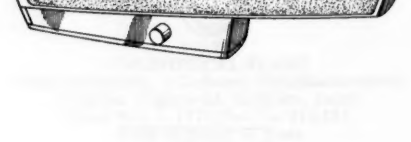
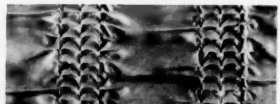


236,764
SHIRRED TEXTILE FABRIC
Carl A. Wettering, Batesville, Ind., assignor to Batesville Casket Company, Inc.
Filed July 21, 1972, Ser. No. 273,947
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D92—1 AB



236,765
SHIRRED TEXTILE FABRIC
Carl A. Wettering, Batesville, Ind., assignor to Batesville Casket Company, Inc.
Filed July 21, 1972, Ser. No. 273,979
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D92—1 AB

LIST OF PATENTEES

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PATENTS WERE ISSUED ON THE 9TH DAY OF SEPTEMBER, 1975

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Gabliya, Jury Alexandrovich; Levin, Lev Emmanuilovich; Bukharin, Evgeny Mikhailovich; Sloevsky, Fedor Ignatievich; Rubinshtein, Abram Borisovich; Avanesian, Vladimir Ambartsumovich; and Birzeniek, Indulis Krishevich, 3,903,662.

Avco Corporation: *See—*
Exley, John T., 3,904,312.
Hovnanian, Hrair Philip, 3,903,805.
King, Robert W., 3,904,464.
Sweet, Ervin J., 3,903,727.
Watkins, Sidney C., 3,904,119.

Avon Products, Inc.: *See—*
Kinney, James F.; and Gadzala, Antoni Edward, 3,904,357.

Axelsson, Rolf, to Stal Refrigeration AB. Screw compressor. 3,904,322, Cl. 417-310.000.

Axer, Heinrich; and Roth, Gerd, to G. Siempelkamp & Co. Apparatus for making pressed board. 3,904,336, Cl. 425-115.000.

Aycock, David F.; and Sliva, Daniel E., to General Electric Company. Process for recycling a cobalt hydroformylation catalyst. 3,904,547, Cl. 252-414.000.

Ayerst, McKenna & Harrison Ltd.: *See—*
Pelz, Karel; and Dobson, Thomas A., 3,904,617.

Ayres, Robert U.; McKenna, Richard P.; and Keahey, Sammie G., to Variflex Corporation. Pleated, variable speed convcyor and conveyor driving means. 3,903,806, Cl. 104-25.000.

Azcon Corporation: *See—*
Snyder, Byron, 3,903,697.

Azuma, Kanae: *See—*
Kanaya, Yoshinosuke; Hasegawa, Minoru; Azuma, Kanae; Ochiai, Minoru; and Shimizu, Jun, 3,904,929.

B. Braun Melsungen Aktiengesellschaft: *See—*
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B. F. Goodrich Company, The: *See—*
Srail, Raymond C., 3,904,467.

B. Maier KG: *See—*
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Babcock & Wilcox Company, The: *See—*
Carrick, Warner W.; and Friedman, Herbert E., 3,904,944.
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Backhaus, Hans-Gerd: *See—*
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Baddour, Raymond F.: *See—*
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Badger Company, Inc., The: *See—*
King, Norman B., 3,904,484.

Badger, John P., to Eltra Corporation. Battery vent construction. 3,904,441, Cl. 136-177.000.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See—*
Bantel, Karl-Heinz; and Eilingsfeld, Heinz, 3,904,659.
Kichs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, 3,904,673.
Mach, Wolfgang; and Scheuermann, Horst, 3,904,642.
Scheuermann, Horst; Hell, Peter-Matthias; and Burkhardt, Gottfried, 3,904,678.

Bainter, Huston K.; and Nerem, Marvin E., to Winnebago Industries, Inc. Pick-up cover. 3,903,663, Cl. 52-79.000.

Baker, Patrick J., to Eli Lilly and Company. Penicillin oxidation process. 3,904,605, Cl. 260-239.100.

Bald, Robert E.: *See—*
Swanson, Harold V.; and Bald, Robert E., 3,904,213.

Baldwin, Francis P.: *See—*
Kennedy, Joseph P.; and Baldwin, Francis P., 3,904,708.

Baldwin, Richard J., to United States of America, Army. Wind tunnel differential flow flaps. 3,903,740, Cl. 73-147.000.

Balogh, Tibor: *See—*
Mago nee Karacsony, Erzebet; Balogh, Tibor; Uskert nee Dievald, Emilia; Borsi, Jozsef; and Wolf, Lajos, 3,904,633.

Bamberger, Joseph A.; and Brown, Donald P., to United States of America, Energy Research and Development Administration. Electrically insulating feed-through for cryogenic applications. 3,904,815, Cl. 174-151.000.

Bancalari, Eduardo H., to University of Miami. Continuous negative pressure chamber for infants. 3,903,869, Cl. 128-1.00B.

Banks, Malcolm James Peter: *See—*
Jones, William Leslie; and Banks, Malcolm James Peter, 3,904,466.

Banquy, David L. Process for the production of high BTU methane-containing gas. 3,904,389, Cl. 48-215.000.

Bantel, Karl-Heinz; and Eilingsfeld, Heinz, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Production of pure 1-nitroanthraquinone. 3,904,659, Cl. 260-369.000.

Bardy, Andrew. Walking roller skate. 3,904,215, Cl. 280-11.200.

Barenyi, Bela; Wilfert, Karl; and Renner, Hermann, to Daimler-Benz Aktiengesellschaft. Bumper arrangement of a motor vehicle. 3,904,237, Cl. 296-28.00F.

Barenyi, Bela: *See—*
Wilfert, Karl; Barenyi, Bela; Haselmann, Heinrich; Scholz, Hansjurgen; Backhaus, Hans-Gerd; and Brambilla, Luigi, 3,904,223.

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Barrett, David M.; and Stenicka, Alan R., to General Electric Company. X-ray table with bucky elevator. 3,904,531, Cl. 250-444.000.

Barrett, James H., Jr. Safety and locked spark proof battery box. 3,904,439, Cl. 136-171.000.

Barsotti, Rudolf H., to International Business Machines Corporation. Multiplexing switch with wide bandpass characteristics and high isolation impedance between inputs. 3,904,977, Cl. 330-51.000.

Bartlett, Allen R.: *See—*
Bartlett, Robert N.; and Bartlett, Allen R., 3,903,831.

Bartlett, Richard F.; and Case, Laura K., to Itek Corporation. Multiple copy photographic system. 3,903,797, Cl. 101-473.000.

Bartlett, Robert N.; and Bartlett, Allen R., to Waterland Corporation. Amphibious vehicle. 3,903,831, Cl. 115-1.00A.

Barton, Dan K.; and Weber, William. Dial indicator device. 3,903,837, Cl. 116-133.000.

Barton, William W.; and Heath, Thomas D., to Dorr-Oliver Incorporated. Fluidized bed regeneration of powdered activated carbon. 3,904,549, Cl. 252-417.000.

Bartyan, Ladislao Vittorio; and Cipelletti, Alberto. Machine for preparing and dispensing ice-cream with flavor selection. 3,904,085, Cl. 222-131.000.

Basic Incorporated: *See—*
Zegers, Theodoor W.; Goldberger, William M.; Jepsen, Tage L. B.; Lee, Harley C.; and Pearson, Edward P., 3,904,400.

Basic Sciences, Incorporated: *See—*
Fitzpatrick, John Douglas, 3,905,010.

Bass, Joseph A.; McKenzie, Lewis A.; and Powers, Frank M., to Southwire Company. Apparatus for fluxing and filtering of molten metal. 3,904,180, Cl. 266-34.0PP.

Bateman, Coates F., to Veeder Industries, Inc. Fluid dispensing system having token dispenser. 3,904,009, Cl. 194-13.000.

Bates, Calvin D.; and Hartley, Joseph H., to United States of America, Army. Meander line circuit with an interdigital ground plane. 3,904,994, Cl. 333-31.00R.

Batista, Craig S. Spectacle lenses having peaked edges. 3,904,282, Cl. 351-174.000.

Battelle Development Corporation: *See—*
Maringer, Robert E.; Rudnick, Alfred; and Mobley, Carroll E., 3,904,344.

Batzer, Hans; Habermeier, Juerger; and Porret, Daniel, to Ciba-Geigy AG. N,N'-diglycidyl-dicarboxylic acid dianilides. 3,904,658, Cl. 260-348.00A.

Bauer, Benjamin B., to CBS Inc. Directional loudspeaker. 3,903,989, Cl. 181-144.000.

Baughman, Davis L.; and Carpenter, James H., Jr., to Carborundum Company, The. Continuous cleaning apparatus. 3,903,652, Cl. 51-15.000.

Baumann, Frederick William, to General Electric Company. Method for insulating electric armature windings. 3,904,785, Cl. 427-120.000.

Baumann, Hans D. Butterfly valve with quick change trim insert. 3,904,172, Cl. 251-305.000.

Baxter Laboratories, Inc.: *See—*
Bellamy, David, Jr.; and Gould, James L., 3,904,059.
Kiesow, Lutz A., 3,904,296.

Bayer Aktiengesellschaft: *See—*
Buchel, Karl Heinz; and Hammann, Ingeborg, 3,904,762.
Daum, Werner; Frohberger, Paul-Ernst; and Hamburger, Brigitte, 3,904,643.
Kullander, Mats Ove, 3,904,143.
Radlmann, Eduard; Schramm, Jurgen; and Nischk, Gunther, 3,904,589.
Schmitt, Ernst, 3,904,613.
Zorn, Bruno; Noll, Klaus; Oertel, Harald; and Traubel, Harro, 3,904,796.

Bean, Kenneth E.; and Cronin, George R., to Texas Instruments Incorporated. Integrated circuit components in insulated islands of integrated semiconductor materials in a single substrate. 3,905,037, Cl. 357-60.000.

Beatrice Foods Co.: *See—*
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Beaufils, Daniel: *See—*
Truel, Yves; and Beaufils, Daniel, 3,905,032.

Beaujean, Joseph M. E., to Shell Oil Company. Tank for liquified gases. 3,904,068, Cl. 220-63.00R.

Beaumont, Robert; and Bertrand, Bernard, to Automobiles Peugeot; and Regie Nationale des Usines Renault. Control device in particular for a carburetter throttle. 3,903,864, Cl. 123-198.0DB.

Becht, H. Allen; Campbell, James; Kerschner, James J.; and Krollman, Edward J., to Acme Highway Products Corporation. Composite expansion joint assembly. 3,904,303, Cl. 404-68.000.

Beck, Harold D.; and Page, Walter H., to International Harvester Company. Fan shroud entrance structure. 3,903,960, Cl. 165-51.000.

Beck, Robert W.; and Finn, Lyle D., to Exxon Production Research Company. Apparatus for anchoring marine structures. 3,903,705, Cl. 61-46.000.

Becker, Joseph J., to Firmenich SA. Organo peroxides. 3,904,651, Cl. 260-345.200.

Beckman Instruments, Inc.: *See—*
Neti, Radhakrishna M.; and Turner, George S., 3,904,371.

Becorit Grubenausbau GmbH: *See—*
Lubojatsky, Walter, 3,903,703.

Becton, Dickinson and Company: *See—*
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Huston, Paul O.; Douma, William L.; and Gandi, Robert A., 3,903,884.
Mehl, Jack Judson, 3,904,482.

Beemer, Robert J.: *See—*
Hill, Robert R.; and Beemer, Robert J., 3,904,356.

Beene, Gerald Wayne, to Superior Continental Corporation. Ringing generator circuit with capacitor storage. 3,904,833, Cl. 179-84.00R.

Bego, Robert E.; Thomas, William J.; and Voltattorni, Anthony J., to Lear Siegler, Inc. Blow tube assembly. 3,903,952, Cl. 164-200.000.

Behringwerke Aktiengesellschaft: *See—*
Zwisler, Oswald; and Biel, Hans, 3,904,751.

Belke, Jack T., to Westran Corporation. Landing gear housing for trailers. 3,904,224, Cl. 280-150.500.

Bell Telephone Laboratories, Incorporated: *See—*
Cheng, David, 3,904,987.
Cordell, Robert Roger, 3,904,989.
Daniels, Richard William; and Kurth, Carl Ferdinand, 3,904,978.
Dienes, Andrew; Shank, Charles Vernon; and Trozzolo, Anthony Marion, 3,904,982.
DiLorenzo, James Vincent; and Luther, Lars Christian, 3,904,449.
Evans, William Joshua; Grant, Wesley Norman; and Murphy, Bernard Thomas, 3,904,450.
Hagelbarger, David William, 3,904,887.
Hansen, Ralph Holm, 3,904,582.
Judd, Frank Fuller; and Wilhart, Helmut, 3,904,950.
Olson, Hilding Matthews, Jr., 3,904,962.
Peoples, John Terrance, 3,904,839.

Bellamy, David, Jr.; and Gould, James L., to Baxter Laboratories, Inc. Sterile closure for solution bottles. 3,904,059, Cl. 215-247.000.

Bellandi, Gianfranco: *See—*
Ukmar, Luigi; Agostini, Mario; and Bellandi, Gianfranco, 3,904,084.

Bellanger, Maurice Georges; and Daguet, Jacques Lucien, to Telecommunications Radioelectriques et Telephoniques T.R.T. System for the transmission of analog signals by means of pulse code modulation using non-recursive filters. 3,904,963, Cl. 325-38.00B.

Bellussi, Angelo. Clamping and releasing device for rotary hoes and the like. 3,903,969, Cl. 172-5.000.

Beloit Corporation: *See—*
De Noyer, Donald B., 3,904,136.

Beltran, Adrian M.; and Dybas, Robert J., to General Electric Company. Method of bonding a sheet cladding to a concave-convex substrate. 3,904,101, Cl. 228-173.000.

Beltran, Adrian M.; Lindblad, Norman R.; and Wasielewski, Gerald E., to General Electric Company. Corrosion-resistant coating for superalloys. 3,904,382, Cl. 29-194.000.

Beittary, Harold E., to Caribe Circuit Breaker Co., Inc. Circuit breaker. 3,904,998, Cl. 335-43.000.

Benderly, Asaf A., to United States of America, Army. Multi-mode thermal battery. 3,904,435, Cl. 136-90.000.

Bendix Corporation, The: *See—*
Ditlinger, Richard J., 3,903,999.
Estep, Gordon J.; and Burton, Bernard Lee, 3,904,461.
Kamm, Vernon C.; Ioannou, John T.; and Faxon, James L., 3,904,822.
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Benefield, Roy W.: *See—*
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Benjamin Reel Products, Inc.: *See—*
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Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, to Pfizer Inc. Magnetic impulse record member. 3,904,540, Cl. 252-62.540.

Bennett, Albert; and Marin, Glenn R., to Carborundum Company, The. Powder dispersion apparatus. 3,903,838, Cl. 118-6.000.

Bennett, Jack H.: *See—*
Imhoff, Harold J.; Bennett, Jack H.; and Turpin, Dennis E., 3,903,653.

Benz, Donald E.; Garfunkel, James H.; and Kompelien, Arlon D., to Honeywell Inc. Multi-component infrared analyzer. 3,904,880, Cl. 250-343.000.

Berg, Albert T., Jr.: *See—*
Langlie, Howard; and Berg, Albert T., Jr., 3,904,932.

Berger, Robert E., to Goodyear Aerospace Corporation. Segmented brake disk. 3,904,000, Cl. 188-218.0XL.

Bergmann, Adolph G. Wire wrapping tool. 3,903,936, Cl. 140-124.000.

Berkelhammer, Gerald; and Asato, Goro, to American Cyanamid Company. Substituted nitroimidazolyl thiadiazoles and oxadiazoles as antibacterial agents and growth promoting compounds. 3,904,756, Cl. 424-250.000.

Berkovitz, Harry; and Tosato, Lawrence, to Westinghouse Electric Corporation. Closure system. 3,903,996, Cl. 187-52.000.

Berlin, Daniel. Exercising device. 3,904,196, Cl. 272-72.000.

Bernaerts, Henry J. Higher harmonics hub valve. 3,904,313, Cl. 416-20.000.

Bernardi, Luigi: *See—*
Arcari, Giuliana; Bernardi, Luigi; Glasser, Alfredo; and Patelli, Bianca, 3,904,634.

Berndt, Wolf-Dieter, to Applied Optics Corporation. Method and apparatus for ocular self-examination. 3,903,870, Cl. 128-2.00T.

Berry, Robert Frank, to Dresser Industries, Inc. Tubing suspension hanger. 3,904,233, Cl. 294-92.000.

Bertin & Cie: *See—*
Marchal, Philippe Albert Hippolyte; Simonnet, Jacques Louis Paul; and Verrien, Jean Prudent Fernand Rene, 3,904,514.

Bertling, Alfred; and Haselhoff, Freidhelm, to Wilhelm Kemper KG. Agricultural vehicle. 3,904,056, Cl. 214-519.000.

Bertrand, Bernard: *See—*
Beaumont, Robert; and Bertrand, Bernard, 3,903,864.

Bertschmann, Silvio, to Soehne, Friedrich Maurer. Expansion gap sealing device. 3,904,302, Cl. 404-68.000.

Berube, Milton A.: *See—*
Johnson, Gordon C.; and Berube, Milton A., 3,904,805.

Betz Laboratories, Inc.: *See—*
Swered, Paul; and Shema, Bernard F., 3,904,764.

Beyerlein, Fritz W., to Signetics Corporation. Semiconductor assembly and method. 3,905,038, Cl. 357-70.000.

Bialy, Karol J.: *See—*
Lund, Norman; Bialy, Karol J.; Mann, Leland A.; and Woodbridge, David D., Dr., 3,904,882.

Bicik, Vladislav; and Kaspar, Jan, to Gebruder Netzsch, Maschinenfabrik. Separation device for separating grinding elements and ground suspension in an agitator mill. 3,904,133, Cl. 241-69.000.

Bickmire, Walter W.: *See—*
Szevernyi, Nikolaus A.; and Bickmire, Walter W., 3,905,004.

Biddle, Joseph M.; and Binder, Paul B., to Leeds & Northrup Company. Instrument mounting. 3,904,160, Cl. 248-27.000.

Biedermann, Ernst: *See—*
Steinberger, Siegfried; Nagel, Erich; Biedermann, Ernst; Pflugbeil, Mathias; Dreher, Karl; and Fleck, Adolf, 3,904,145.

Biel, Hans: *See—*
Zwisler, Oswald; and Biel, Hans, 3,904,751.

Binder, Paul B.: *See—*
Biddle, Joseph M.; and Binder, Paul B., 3,904,160.

Binder, Wolfgang Max, to RCA Corporation: Grinding machine for generating a surface of revolution on a hollow workpiece. 3,903,656, Cl. 51-108.00R.

Bindler, Jakob: *See—*
Model, Ernst; and Bindler, Jakob, 3,904,696.

Bindrum, Irmgard: *See—*
Brandt, Wilhelm; and Bindrum, Irmgard, 3,904,794.

Bio-Medical Sciences, Inc.: *See—*
Pickett, Charles G., 3,903,939.

Birum, Gail H., to Monsanto Company. Urea-phosphorus compounds. 3,904,654, Cl. 260-347.200.

Birzeniek, Indulis Krishevich: *See—*
Gabliya, Jury Alexandrovich; Levin, Lev Emmanuilovich; Bukharin, Evgeny Mikhailovich; Sloevsky, Fedor Ignatievich; Rubinshtein, Abram Borisovich; Avanesian, Vladimir Ambartsumovich; and Birzeniek, Indulis Krishevich, 3,903,662.

Bisberg, Aaron M. Bicycle training device for simulating the movement of a bicycle equipped with gears. 3,903,613, Cl. 35-11.000.

Bissett-Berman Corporation, The: *See—*
Bissett, Thomas B.; and Tatch, Martin S., 3,903,736.

Bissett, Thomas B.; and Tatch, Martin S., to Bissett-Berman Corporation, The. Service computer using electrolytic cell storage member. 3,903,736, Cl. 73-117.300.

Bitterling, Kay M. Amplifier, especially for low frequencies, utilizing parallel amplifying channels within NPN transistors. 3,904,893, Cl. 307-254.000.

Bizerba-Werke Wilhelm Kraut KG: *See—*
Ziefle, Martin, 3,903,976.

Black and Decker Manufacturing Company, The: *See—*
Pfister, Herbert R., 3,903,657.

Blackmore, Fred N.; Blackmore, Fred N., Jr.; and Trachet, John R. Germinating tray. 3,903,643, Cl. 47-34.130.

Blackmore, Fred N., Jr.: *See—*
Blackmore, Fred N.; Blackmore, Fred N., Jr.; and Trachet, John R., 3,903,643.

Blackwell, Henry W.: *See—*
Pugh, Toby S.; and Blackwell, Henry W., 3,904,212.

Blackwell, John; and Peavy, Richard Edwin, to du Pont de Nemours, E. I., and Company. Brown disperse 4-carboxamido-4'-phenylazoazobenzene dyes. 3,904,596, Cl. 260-187.000.

Blaha, Emil, to Selas Corporation of America. Method of placing membrane on support. 3,904,788, Cl. 427-232.000.

Blake, Robert J.: *See—*
Atwood, Gilbert R.; Blake, Robert J.; Butwell, Kenneth F.; and Dunnery, David A., 3,904,735.

Blakemore, Bernard: *See—*
Sword, Geoffrey; Lawrence, John Leslie; Raggett, Stephen Richard; and Blakemore, Bernard, 3,904,819.

Blank, Rudolf; and Kluczynski, Achim, to Agfa-Gevaert Aktiengesellschaft. Rechargeable magazine for motion picture film. 3,904,284, Cl. 352-78.00R.

Blay, Jorge Alberto: *See—*
Shahidi, Iraj Khatib; and Blay, Jorge Alberto, 3,904,685.

Blissell, Walter A., Jr.: *See—*
Hoffmann, William F.; and Blissell, Walter A., Jr., 3,904,259.

Blohm & Voss AG: *See—*
Wortmann, Ernst; and Krakow, Heinz, 3,904,096.

Blok, Huibert, to U.S. Philips Corporation. System for locating faulty line repeaters of repeater stations in a transmission line. 3,904,827, Cl. 179-175.31R.

Board of Regents for Education of the State of Rhode Island: *See—*
Dymsza, Henry A., 3,904,774.

Board of the Rubber Research Institute of Malaysia, The: *See—*
Sung, Chin Peng, 3,904,567.

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Boeing Company, The: *See—*
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Kuehn, Riley, Jr., 3,904,718.
Sullivan, Douglas C.; Ross, Edward C.; and Saelid, Per O., 3,904,443.
Watts, John, 3,904,153.

Boese, Harold L., to H & B Enterprises, Inc. Convertible fishing reel. 3,903,635, Cl. 43-22.000.

Bogie, Nelson H. Solid waste chipper. 3,904,135, Cl. 241-86.000.

Bohlmark, Arne Sven, to Sunds Aktiebolag. Rod counter. 3,904,020, Cl. 198-40.000.

Boiardi, Mario J., to Boiardi Products Corporation. Method of installing a divider strip in a terrazzo floor. 3,903,587, Cl. 29-418.000.

Boiardi Products Corporation: *See—*
Boiardi, Mario J., 3,903,587.

Boileau, Jacques, to Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie. Radial tire with additional sidewall reinforcement. 3,904,463, Cl. 156-123.000.

Bolea Camprubi, D. Anselmo. Cutting, clamping and weft presentation mechanism for looms. 3,903,932, Cl. 139-303.000.

Boler, Leonard J., to Cherne Industrial, Inc. Liquid cooling apparatus. 3,904,713, Cl. 261-90.000.

Bolser, Clark M. Gas sampler for collecting and measuring gaseous emissions from flues. 3,903,745, Cl. 73-421.50A.

Bongenaar, Hendrik, to U.S. Philips Corporation. Cathode-ray tube with implosion safety. 3,904,820, Cl. 178-7.820.

Bookwrights, Inc.: *See—*
Sendor, Bernard T., 3,904,227.

Booth, Vernard S., to Olinkraft, Inc. Bulk material container. 3,904,105, Cl. 229-15.000.

Boothby, Walter Evelyn Brooke, to Post Office, The. Wire wrapping apparatus. 3,903,935, Cl. 140-124.000.

Borg-Warner Corporation: *See—*
Newton, Alwin B., 3,903,962.

Borman, Willem F. H.; and Reilly, Eugene P., to General Electric Company. Preparation of polyester resins with enhanced molding properties. 3,904,561, Cl. 260-22.00R.

Born, Ellis H.; and Viles, Alan H., to Abex Corporation. Fluid energy translating device. 3,904,318, Cl. 417-199.000.

Boroschewski, Gerhard; and Arndt, Friedrich, to Schering Aktiengesellschaft. N-acyl biscarbamate herbicides. 3,904,669, Cl. 260-471.00C.

Boroschewski, Gerhard, Dr.; Arndt, Friedrich, Dr.; and Czyzewski, Alfred, Dr., to Schering Aktiengesellschaft. Herbicidal mixture of several carbamoyloxyphenylcarbamates. 3,904,396, Cl. 71-111.000.

Borsi, Jozsef: *See—*
Mago nee Karacsony, Erzebet; Balogh, Tibor; Uskert nee Dievald, Emilia; Borsi, Jozsef; and Wolf, Lajos, 3,904,633.

Borup, Lennart A.: *See—*
Thim, Stig Helge Gunnar; and Borup, Lennart A., 3,904,112.

Bosshard, Alfred: *See—*
Delfosse, Pierre; and Bosshard, Alfred, 3,904,130.

Bosshard, Ulrich Walter; Kupper, Arthur Kurt; and Lohr, Manfred, to Holderbank Management & Consulting Ltd. Method and apparatus for the heat treatment of a material in powder form. 3,904,353, Cl. 432-14.000.

Botting, John Robert: *See—*
Martin, George Roy; and Botting, John Robert, 3,904,323.

Bottles, David M., to Compucorp. Large mark tolerance card reader. 3,904,110, Cl. 235-61.11E.

Bottomley, Herbert Geoffrey, to Landis Lund Limited. Grinding machine. 3,904,390, Cl. 51-165.800.

Boucek, Richard A.; and Young, John S., to GTE Automatic Electric Laboratories Incorporated. Control of devices used as computer memory and also accessed by peripheral apparatus. 3,905,024, Cl. 340-172.500.

Bouchard, Andre C.; and Sentementes, Thomas J., to GTE Sylvania Incorporated. Photoflash lamp. 3,904,348, Cl. 431-95.000.

Bourns, Inc.: *See—*
Weigl, James, 3,903,881.

Bous, Karl. Apparatus for connecting two or more working operations in the production, preparation or finishing of yarns. 3,903,681, Cl. 57-34.00R.

Bouyoucos, John V.; and Selsam, Roger L., to Hydroacoustics Inc. Impact tools. 3,903,972, Cl. 173-134.000.

Bowers, William S., to United States of America, Agriculture. Synthetic terpenoid compounds for insect control. 3,904,763, Cl. 424-278.000.

Bowling, George W., to Monsanto Company. Knife edge template. 3,903,842, Cl. 118-301.000.

Bowman, Earl K.; and Teele, John C., to United States of America, Agriculture. Opening and gripping mechanism for automatic produce-bagging machine that uses factory-roll polyethylene net tubing. 3,903,677, Cl. 53-384.000.

Bowman, Earl K.; and Teele, John C., to United States of America, Agriculture. Spreader mandrel for automatic produce-bagging machine that uses factory-roll polyethylene net tubing. 3,903,678, Cl. 53-393.000.

Boyd, Horace Edward, to Cooper Industries, Inc. Speed sensing air tool shutoff. 3,904,305, Cl. 415-25.000.

Boyden, Robert E.; and Watanabe, Rii. Power-driven typewriter. 3,904,015, Cl. 197-151.000.

BP Chemicals International Limited: *See—*
Fogg, Sidney George; and Walker, David John, 3,904,576.

BPB Industries Limited: *See—*
Cuin, David Ernest; and Shaw, Alan, 3,903,671.

Bracey, Jep T. Oxygenation system. 3,903,636, Cl. 43-56.000.

Braddicks, Robert P., to Union Carbide Corporation. Novel floor-tile compositions comprising plasticized vinyl chloride polymers. 3,904,579, Cl. 260-42.460.

Braddock, Peter David Michael: *See—*
Tobe, Martin Leslie; Khokhar, Abdul Rauf; and Braddock, Peter David Michael, 3,904,663.

Bradley, Robert: *See—*
Speirs, Kenneth K.; Hoy, William M.; and Bradley, Robert, 3,904,789.

Bradner, Norman R., to Pfizer Inc. Hybrid soybean production. 3,903,645, Cl. 47-58.000.

Bragdon, Robert W.: *See—*
Thunberg, Jon C.; Bragdon, Robert W.; and Moore, William P., 3,904,585.

Brambilla, Luigi: *See—*
Wilfert, Karl; Barenyi, Bela; Haselmann, Heinrich; Scholz, Hansjurgen; Backhaus, Hans-Gerd; and Brambilla, Luigi, 3,904,223.

Brandis, Curt, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Smoothening device for cross-lapper. 3,903,569, Cl. 19-163.000.

Brandt, Wilhelm; and Bindrum, Irmgard, to Hoechst Aktiengesellschaft. Process for the manufacturing of a planographic printing plate capable of being processed into a planographic printing form requiring no wetting. 3,904,794, Cl. 427-375.000.

Braun Aktiengesellschaft: *See—*
Cobarg, Claus Christian, 3,903,597.

Braun, Eugene R.; and Richards, Elmer A., to Eaton Corporation. Fluid engaged clutch with speed and accelerator controls. 3,904,007, Cl. 192-.076.

Braun, John D.: *See—*
Sieg, George F.; Gerrish, Howard W., Jr.; Braun, John D.; and Pickett, M. Frank, 3,904,715.

Brayshaw, Forrest G., to Hogle-Kearns International. Method and apparatus for generating plasma. 3,903,891, Cl. 128-303.140.

Brazeau, Paul E., Jr.: *See—*
Guillemin, Roger C. L.; Brazeau, Paul E., Jr.; Burgus, Roger C.; Ling, Nicholas C.; Rivier, Jean E. F.; and Vale, Wylie W., Jr., 3,904,594.

Brem, Jack W. Method and means of producing grass sod. 3,903,816, Cl. 111-1.000.

Bremer, Allen R., to Taiga Industries, Inc. Die-head. 3,904,340, Cl. 425-297.000.

Bremer, Horst, to Gunther Papenmeier KG Maschinen- un Apparatebau. Process for cooling granular materials being mixed. 3,903,957, Cl. 165-1.000.

Brenner, Alfred E.: *See—*
Whetstone, Albert L.; and Brenner, Alfred E., 3,904,821.

Brewer, Robert O.; and Soto, Manuel A. Removable studs for electric power consumption meters. 3,904,935, Cl. 317-107.000.

Bridger, Robert Frederick: *See—*
Heiba, El-Ahmadi Ibrahim; and Bridger, Robert Frederick, 3,904,511.

Brinegar, Billy M., to Rockwell International Corporation. Threshold extension switch. 3,904,968, Cl. 325-408.000.

Bristol-Myers Company: *See—*
Naito, Takayuki; Nakagawa, Susumu; and Abe, Yoshio, 3,904,597.

Bristol Products, Inc.: *See—*
Cohn, Lawrence P.; Turner, Larry G.; and Crawford, Dennis W., 3,904,169.

British Columbia Research Council: *See—*
Clark, Trevor P., 3,904,512.

British Gas Corporation: *See—*
Dicks, Andrew Leslie, 3,904,554.

British Petroleum Company Limited, The: *See—*
du Chaffaut, Jean Amaudric; Hondermarck, Jean Claude; and Laine, Bernard Maurice, 3,904,485.

Britton, Ralph H., Jr., to Pacific Measurements, Inc. Swept frequency measurement system. 3,904,959, Cl. 324-57.0SS.

Brix, Jochim E., to Schottel-Werft, Josef Becker KG. Lateral thrust control unit for watercrafts. 3,903,829, Cl. 114-151.000.

Brodnitz, Michael H.: *See—*
Pittet, Alan O.; Pascale, John V.; Patton, Stuart; and Brodnitz, Michael H., 3,904,556.

Brook, John W.: *See—*
Mayo, William E.; and Brook, John W., 3,904,564.

Brookman, Donald, to Metallic Valve Company Limited, The. Valve plate component with spring-arm structure. 3,903,921, Cl. 137-516.130.

Brooks, Albert H.: *See—*
Faurschou, Donald K.; Cohen, Harold A.; Brooks, Albert H.; Alcock, Charles B.; and Monier-Williams, Craufurd S., 3,904,486.

Brooks, Ralph J., to Klein, Andrew R., trustee. Replacement impact absorbing container. 3,903,997, Cl. 188-1.00C.

Brown, Albert E.; Schlotzhauer, Allan T.; and Newman, Douglas A., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Transfer elements and methods of preparing same. 3,904,802, Cl. 428-320.000.

Brown, Albert E.; Schlotzhauer, Allan T.; and Newman, Douglas A., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Transfer elements and process. 3,904,803, Cl. 428-320.000.

Brown, Bruce J., to United States of America, Navy. Conversion of plug-in oscilloscope to radar B-scope. 3,904,926, Cl. 315-378.000.

Brown, Donald P.: *See—*
Bamberger, Joseph A.; and Brown, Donald P., 3,904,815.

Brown, Frank C.: *See—*
Repp, John M.; and Brown, Frank C., 3,904,030.

Brown, Fred E. Adjusting device for lumber planer. 3,903,609, Cl. 33-185.00R.

Brown, Howard L.; and Mowat, James F., Jr., to Tenneco Inc. Muffler housing. 3,903,987, Cl. 181-61.000.

Broz, Stephen E., to PPG Industries, Inc. Process for preparing monoethylene glycol and ethylene oxide. 3,904,656, Cl. 260-348.50R.

Bruckner Apparatebau GmbH: *See—*
Schuierer, Manfred, 3,904,360.

Brush, John Burke; and Hooper, Leonard Cecil, to Procter & Gamble Company, The. Packaging apparatus. 3,903,674, Cl. 53-188.000.

Bryson, Jay G., to Goodyear Tire & Rubber Company, The. Process for preparing nonconjugated diolefins. 3,904,704, Cl. 260-680.00B.

Buchel, Karl Heinz; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. 2-Arylaminonitrothiophenes as insecticides and acaricides. 3,904,762, Cl. 424-275.000.

Buckler, Ernest Jack: *See—*
Lasis, Evalds; Buckler, Ernest Jack; and Dunn, John Robert, 3,904,580.

Buckman, Thomas P. Unitary check valve and retainer therefor. 3,903,922, Cl. 137-525.000.

Budai, Zoltan; Pallos, Laszlo; Petocz, Lujza E.; and Kosoczky, Ibolya, to Egyt Gyogyszervegyeszeti Gyar. Novel cycloalkanol fumarate ethers and a process for the preparation thereof. 3,904,628, Cl. 260-268.00R.

Buelow, Joseph S.; and Reid, Thomas S., to Minnesota Mining and Manufacturing Company. Time-delay metering dispenser. 3,903,888, Cl. 128-222.000.

Bugaut, Andree: *See—*
Kalopissis, Gregoire; and Bugaut, Andree, 3,904,690.

Buisson, Francois, to Rhone-Poulenc-Textile. Textile articles for protective clothing. 3,904,577, Cl. 260-37.00N.

Bukharin, Evgeny Mikhailovich: *See—*
Gabliya, Jury Alexandrovich; Levin, Lev Emmanuilovich; Bukharin, Evgeny Mikhailovich; Sloevsky, Fedor Ignatievich; Rubinshtein, Abram Borisovich; Avanesian, Vladimir Ambartsumovich; and Birzeniek, Indulis Krishevich, 3,903,662.

Bundy, Gordon L., to Upjohn Company, The. 15-Methyl and 15-ethyl prostaglandin F_2 analogs. 3,904,679, Cl. 260-514.00D.

Burch, Charles A.; and West, Robert E., to Xmas, Inc. Pipeline crawler type x-ray machine. 3,904,878, Cl. 250-321.000.

Burchett, Paul James. Sports racket stroking trainer. 3,904,199, Cl. 273-29.00A.

Burden Automotive Electric, Incorporated: *See—*
Burden, Walter; and Mundo, James, 3,903,737.

Burden, Walter; and Mundo, James, to Burden Automotive Electric, Incorporated. Apparatus for testing starter motors. 3,903,737, Cl. 73-118.000.

Burgess, William B.: *See—*
Magnino, Pete Joseph, Jr.; Burgess, William B.; and Meyer, Richard R., 3,904,776.

Burgus, Roger C.: *See—*
Guillemin, Roger C. L.; Brazeau, Paul E., Jr.; Burgus, Roger C.; Ling, Nicholas C.; Rivier, Jean E. F.; and Vale, Wylie W., Jr., 3,904,594.

Burkhardt, Gottfried: *See—*
Scheuermann, Horst; Hell, Peter-Matthias; and Burkhardt, Gottfried, 3,904,678.

Burki, Hughes, to Societe Suisse pour l'Industrie Horlogere Management. Chronograph movement. 3,903,686, Cl. 58-74.000.

Burroughs Corporation: *See—*
Perpiglia, Frank Joseph, 3,905,023.

Burrus, Joe H., to Allis-Chalmers Corporation. Means for detecting ground insulation failure for rotary electric machines. 3,904,940, Cl. 317-262.00R.

Bursk, William M.: *See—*
Pease, David H., Jr.; and Bursk, William M., 3,903,669.

Bursott, Leslie W.; Caldwell, Robert M.; and Cameron, Donald K., to General Motors Corporation. Occupant restraint system. 3,904,222, Cl. 280-150.0AB.

Burton, Bernard Lee: *See—*
Estep, Gordon J.; and Burton, Bernard Lee, 3,904,461.

Busby, Daisy H. Swimming aid. 3,903,555, Cl. 9-342.000.

Business Equipment Center Ltd.: *See—*
Johnson, Charles C., 3,905,042.

Buttgens, Walter: *See—*
Jenkner, Herbert; and Buttgens, Walter, 3,904,694.

Butwell, Kenneth F.: *See—*
Atwood, Gilbert R.; Blake, Robert J.; Butwell, Kenneth F.; and Dunnery, David A., 3,904,735.

Buznyakov, Kirill Vladimirovich: *See—*
Dauge, Vitaly Teodorovich; and Buznyakov, Kirill Vladimirovich, 3,903,766.

Byles, Clauriste H. Grapple arrangement for vehicle. 3,904,232, Cl. 294-88.000.

Calbeck, J. R., Trustee: *See—*
Calbeck, John H., 3,904,375.

Calbeck, John H., to Calbeck, J. R., Trustee. Fluosolid reactor for producing metallic sulphates. 3,904,375, Cl. 23-277.00R.

Calderon, Reynaldo: *See—*
Umphenour, Charles F.; and Calderon, Reynaldo, 3,903,913.

Caldwell, Robert M.: *See—*
Bursott, Leslie W.; Caldwell, Robert M.; and Cameron, Donald K., 3,904,222.

California Computer Products, Inc.: *See—*
Klang, Daniel M., 3,904,943.

Calogero, William J.: *See—*
Adler, Stanford L.; and Calogero, William J., 3,904,369.

Cameron, Donald K.: *See—*
Bursott, Leslie W.; Caldwell, Robert M.; and Cameron, Donald K., 3,904,222.

Campbell, James: *See—*
Becht, H. Allen; Campbell, James; Kerschner, James J.; and Krollman, Edward J., 3,904,303.

Campbell, Larry E.; and Johnson, Robert L., to Corning Glass Works. Thermally stable composite base metal oxide catalysts. 3,904,553, Cl. 252-465.000.

Campbell, Robert W., to Phillips Petroleum Company. Formation of salts of terephthalic acid and 5-methyl-1,9-nonanediamine. 3,904,677, Cl. 260-501.200.

Camper-Flow Mfg. Co.: *See—*
Johnson, Daniel H.; and Johnson, Harry T., 3,904,236.

Canadian Patents and Development Limited: *See—*
Faurschou, Donald K.; Cohen, Harold A.; Brooks, Albert H.; Alcock, Charles B.; and Monier-Williams, Craufurd S., 3,904,486.
LaRue, Thomas Alfred; and Kurz, Wolfgang Gebhard Walter, 3,904,481.
Sieben, Anthony, 3,903,731.

Cannondale Corporation: *See—*
Montgomery, Joseph; and Wistrand, John, 3,903,944.

Canon Kabushiki Kaisha: *See—*
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo, 3,904,408.
Hanada, Hiroshi; and Takahashi, Toru, 3,904,409.
Inoue, Shunzo, 3,904,099.
Matsumoto, Kazuya, 3,904,835.

Omi, Kokichi; and Inoue, Shunzo, 3,904,286.
Sanada, Noriaki, 3,904,279.
Takahashi, Toru, 3,904,406.

Canonge, Sidney J., to S. I. Development Co. Rhythmic dancing poles. 3,904,197, Cl. 272-74.000.

Caragliano, Edward S.; and Nick, Howard H., to International Business Machines Corporation. Automatic gain control for encoded data. 3,904,824, Cl. 178-70.00R.

Carborundum Company, The: *See—*
Baughman, Davis L.; and Carpenter, James H., Jr., 3,903,652.
Bennett, Albert; and Marin, Glenn R., 3,903,838.

Cardin, Robert A.; and Zeman, Kenneth P., to General Electric Company. Bucket locking mechanism. 3,904,317, Cl. 416-220.000.

Caribe Circuit Breaker Co., Inc.: *See—*
Belttary, Harold E., 3,904,998.

Carino, John W., to General Electric Company. Capacitor case seal and venting means. 3,904,939, Cl. 317-230.000.

Carlen, Bo Robert Junior; and Andersson, Anders Ingvar, to Ahlen & Akerlunds Forlags AB. Method and conveying path for the separation of at least one signature from a stream of signatures. 3,904,019, Cl. 198-31.0AB.

Carman, Vincent E. Hydraulic energy storage transmission. 3,903,696, Cl. 60-414.000.

Carmichael, Donald C.; Chambers, Douglas L.; and Wan, Chong T., to Shatterproof Glass Corporation. Apparatus for continuous production of sputter-coated glass products. 3,904,506, Cl. 204-298.000.

Carnarius, Clarence L. Drain with check valve. 3,903,918, Cl. 137-433.000.

Carnmalm, Bernt Sigfrid Emanuel; de Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, to Astra Lakemedel Aktiebolag. Compounds of spiro-amine type. 3,904,691, Cl. 260-576.000.

Caron, Roger P.; and Luke, Chester, to Arthur D. Little, Inc. Pressurized product dispenser. 3,904,124, Cl. 239-350.000.

Carpenter, James H., Jr.: *See—*
Baughman, Davis L.; and Carpenter, James H., Jr., 3,903,652.

Carpenter Technology Corporation: *See—*
Mertz, David L.; and Caton, Robert L., 3,904,401.

Carrick, Warner W.; and Friedman, Herbert E., to Babcock & Wilcox Company, The. Machine tool control. 3,904,944, Cl. 318-578.000.

Carroll, Willard D., to Smith, Robert A., a part interest. Grade indicator stake flag holder. 3,903,835, Cl. 116-114.00R.

Carter, Arthur L.: *See—*
VanIngen, Jack A.; Maddocks, Roger H.; and Carter, Arthur L., 3,904,392.

Carter, James L.: *See—*
Sinfelt, John H.; and Carter, James L., 3,904,510.

Carver, Fred F.: *See—*
Diamond, John A.; Sylvester, Amedeo A.; and Carver, Fred F., 3,903,614.

Casavant Freres Limited: *See—*
Ferch, Werner, 3,903,778.

Case, Laura K.: *See—*
Bartlett, Richard F.; and Case, Laura K., 3,903,797.

Casey, Thomas J.; and Loeffler, George F., to Thomas Machinery Corporation. Method and apparatus for sorting and cleaning bottles. 3,903,563, Cl. 15-304.000.

Cash, George. Entrainment nozzle. 3,904,127, Cl. 239-562.000.

Castella, Frank R.: *See—*
Moore, Thomas A.; and Castella, Frank R., 3,905,033.

Castone Development Corporation: *See—*
Prince, Douglas F., 3,904,723.

Caterpillar Tractor Company: *See—*
Keetley, Reginald George, 3,904,309.
Kroth, Neil W.; Lohbauer, Kenneth R.; and Scheidt, James E., 3,903,787.

Caton, Robert L.: *See—*
Mertz, David L.; and Caton, Robert L., 3,904,401.

Cavalier Corporation: *See—*
Payne, Harry R., 3,904,076.

Cayia, Patricia G.: *See—*
Aris, Gordon R., 3,903,949.

CBS Inc.: *See—*
Bauer, Benjamin B., 3,903,989.

Cegedur Societe de Transformation de l'Aluminium: *See—*
Le Grand, Robert; Freville, Christian; and Colas, Francois, 3,903,822.

Celada, Juan; MacKay, Patrick W.; Martinez, Enrique Ramon; Villasenor, Antonio; and Viramontes, Ricardo, to Fierro Esponja, S.A. Method for reducing metal ores. 3,904,397, Cl. 75-35.000.

Celanese Corporation: *See—*
Shahidi, Iraj Khatib; and Blay, Jorge Alberto, 3,904,685.
Vogt, Clifford M.; Soehngen, John W.; and Polise, Joseph C., 3,904,798.
Watson, George A., 3,903,568.

Centre de Recherches Metallurgiques - Centrum voor Research in de Metallurgie: *See—*
Decker, Alfred, 3,904,398.

Cercone, Ronald; and Dennison, Edward S., to Electrochem, Inc. Method and means for activating a closed battery. 3,904,436, Cl. 136-90.000.

Cessna, Lawrence C., Jr., to Hercules Incorporated. Thermosetting compositions containing poly(arylacetylenes) and an aromatic ring compound having the rings joined through a nitrogen. 3,904,574, Cl. 260-32.60R.

Chadbourne, Gilbert R., to Keyes Fibre Company. Packaging tray. 3,904,103, Cl. 229-2.500.

Chambers, Douglas L.: *See—*
Carmichael, Donald C.; Chambers, Douglas L.; and Wan, Chong T., 3,904,506.

Chamot, Marcel: *See—*
Kuster, Walter; and Chamot, Marcel, 3,903,559.

Charlton, John R., to Hexcel Corporation. Transmission cable filling compound. 3,904,541, Cl. 252-63.200.

Chavanne, Rene. Body exercising and re-education apparatus. 3,904,195, Cl. 272-58.000.

Chavis, Gene, to Alaska-Sky Craft Co., Inc. Helicopter step and cargo carrier assembly. 3,904,155, Cl. 244-118.00R.

Chelton, Raymond G.: *See—*
Hekal, Ihab M.; and Chelton, Raymond G., 3,904,569.

Chemische Fabrik Kalk G.m.b.H.: *See—*
Jenkner, Herbert; and Buttgens, Walter, 3,904,694.

Chemische Fabrik Pfersee G.m.b.H.: *See—*
Pusch, Gunter, 3,904,661.

Chemische Werke Huls Aktiengesellschaft: *See—*
Hesse, Karl-Dieter; and Koch, Karl-Ernst, 3,904,498.
Mengler, Claus-Dieter; and Schuller, Hans-Peter, 3,904,688.

Cheng, David, to Bell Telephone Laboratories, Incorporated. Cavity dumping of a laser in its unstable frequency regime. 3,904,987, Cl. 331-94.50Q.

Cheo, Peter K., to United Aircraft Corporation. Integrated optical signal processing system. 3,904,270, Cl. 350-96.0WG.

Cherne Industrial, Inc.: *See—*
Boler, Leonard J., 3,904,713.

Chevron Research Company: *See—*
Gordon, Chester D.; Lowe, Warren; and Hotten, Bruce W., 3,904,535.
Kemp, Jacob D.; and Sieg, Robert P., 3,904,384.

Chiba, Kazuo; and Osanai, Takenori, to Tokyo Shibaura Electric Co., Ltd. Apparatus for classifying sheet-like written material. 3,904,516, Cl. 209-74.00M.

Chiba, Koji: *See—*
Takahashi, Noboru; Chiba, Koji; Nakamura, Mutsuaki; Ozaki, Sadao; Isono, Hiromasa; Naruse, Tunehide; Mishihara, Toshikazu; and Fukushima, Iwao, 3,904,448.

Chibana, Masanobu: *See—*
Kondo, Michio; Nakada, Akira; Chibana, Masanobu; Futamase, Tsuyoshi; and Ohya, Akiyoshi, 3,903,775.

Chibata, Ichiro; Yamada, Shigeki; Yamamoto, Masao; and Sanematsu, Hisato, to Tanabe Seiyaku Co., Ltd. Resolution of tryptophan using benzenesulfonic acid and p-phenolsulfonic acid. 3,904,646, Cl. 260-326.14T.

Chicago Bridge & Iron Company: *See—*
Laverman, Royce Jay; Davis, Robert Newton; and La Fave, Ivan Vallier, 3,903,824.

Chijiiwa, Rikio: *See—*
Gondo, Hisashi; Nakasugi, Hajime; Mazuda, Hiroo; Kawada, Yasayuki; Chijiiwa, Rikio; and Matsuda, Shoichi, 3,904,447.

Chilpan, Kurt Constantine, to Roberts Company. Ring-traveler assembly for a textile twisting machine or the like. 3,903,689, Cl. 57-119.000.

Chisum, Gloria T.; and Nichparenko, John, to United States of America, Navy. Ophthalmodynamometer. 3,903,871, Cl. 128-2.00T.

Chivukula, Krishna; and Lee, Wilfred J., to Clarkson Industries, Inc. Device for regreasing bearings. 3,903,992, Cl. 184-1.00D.

Chore-Time Equipment, Inc.: *See—*
Hostetler, Eldon, 3,904,082.

Christgau, Hermann; Schubert, Wolfgang; and Stachowiak, Aribert, to Siemens Aktiengesellschaft. Inlet screen for intensifying x-ray images. 3,904,532, Cl. 250-483.000.

Christie, Christopher E.; Appleby, Paul E.; and Tully, Frank R., to Goodyear Tire & Rubber Company, The. Transverse flash breaking in tire manufacture. 3,903,948, Cl. 157-13.000.

Chromalloy American Corporation: *See—*
Speirs, Kenneth K.; Hoy, William M.; and Bradley, Robert, 3,904,789.

Chronister, Clyde H.; Grieger, Cecil C.; Oliver, Alton D.; and Benefield, Roy W., to Chronister Development, Inc. Multi-function cam operator for valve. 3,904,171, Cl. 251-159.000.

Chronister Development, Inc.: *See—*
Chronister, Clyde H.; Grieger, Cecil C.; Oliver, Alton D.; and Benefield, Roy W., 3,904,171.

Chrysler Corporation: *See—*
Quatman, Robert J., 3,903,710.

Chu, Tze Yao; Mollendorf, Joseph Charles; and Pfahl, Robert Christian, Jr., to Western Electric Company, Incorporated. Apparatus and method for soldering, fusing or brazing. 3,904,102, Cl. 228-180.000.

Ciba-Geigy AG: *See—*
Batzer, Hans; Habermeier, Juerger; and Porret, Daniel, 3,904,658.
Ciark, David Ronald; and Hyde, Thomas Gerald, 3,904,544.
Jaeger, Horst, 3,904,644.

Ciba-Geigy Corporation: *See—*
Eichenberger, Kurt; and Egli, Christian, 3,904,681.
Model, Ernst; and Bindler, Jakob, 3,904,696.
Somlo, Tibor, 3,904,602.

Cincinnati Milacron, Inc.: *See—*
Phillips, Ruben Verldon, 3,903,577.

Ciolli, Henry J., to General Motors Corporation. Circuit for producing an output signal during the period between the pulses of repeating time displaced pulse pairs. 3,904,894, Cl. 307-260.000.

Cipelletti, Alberto: *See—*
Bartyan, Ladislao Vittorio; and Cipelletti, Alberto, 3,904,085.

Cities Service Oil Company: *See—*
Wolford, Lionel T.; and Wadsworth, Francis T., 3,904,700.

Clark, David Ronald; and Hyde, Thomas Gerald, to Ciba-Geigy AG. Treatment of optical brightening agents. 3,904,544, Cl. 252-301.20W.

Clark Equipment Company: *See—*
Kraus, Peter B., 3,903,978.

Clark, Trevor P., to British Columbia Research Council. Method for reclaiming used crankcase oil. 3,904,512, Cl. 208-182.000.

Clarke, Maurice George: *See—*
Wolfe, Kenneth Roy; and Clarke, Maurice George, 3,904,908.

Clarke, Ronald A. W., to Klarcrete, Limited. Machine for cutting recess in concrete by impact. 3,904,245, Cl. 299-37.000.

Clarkson Industries, Inc.: *See—*
Chivukula, Krishna; and Lee, Wilfred J., 3,903,992.

Clayton Specialties, Inc.: *See—*
Plumb, William W., 3,903,675.

Cleare, Ian Martin: *See—*
Sykes, William Fillans; Weeden, Anthony Joseph; and Cleare, Ian Martin, 3,903,928.

Clegg, Giles C., Jr.: *See—*
Tate, George W., Jr., 3,904,280.

Clement, Clyde H., to Phoenix Pump Company. Multi-purpose pump. 3,904,326, Cl. 417-571.000.

Clements, Herbert Arthur, to S.S.S. Patents Limited. Synchronous self-shifting clutch. 3,904,006, Cl. 192-67.00A.

Cleveland, Joseph J.: *See—*
Warner, Leadom A.; and Cleveland, Joseph J., 3,904,473.

Cline, Harvey E.: *See—*
Anthony, Thomas R.; and Cline, Harvey E., 3,904,442.

Clingman, David L.; Schechter, Berton; Herman, Marvin; and Sippel, George R., to General Motors Corporation. Turbine rotor with slot loaded blades and composite bands. 3,904,316, Cl. 416-218.000.

Cloud, Samuel P.; Kalthoff, Clement H.; Rueger, William J.; and Thompson, Timothy W., to International Business Machines Corporation. Control for self-threading tape in a helical path. 3,904,148, Cl. 242-182.000.

Clough, Roy L., Jr. Seal for rotary device. 3,904,332, Cl. 418-115.000.

Coal Industry (Patents) Limited: *See—*
Gandy, John Albert; and French, Albert Graham, 3,904,246.

Cobarg, Claus Christian, to Braun Aktiengesellschaft. Dry shavers. 3,903,597, Cl. 30-43.910.

Cochran, Michael J.; and Grant, Charles P., Jr., to Texas Instruments, Incorporated. Calculator system having a constant memory. 3,904,862, Cl. 235-156.000.

Cochran, Michael J.; and Grant, Charles P., Jr., to Texas Instruments, Incorporated. Calculator system using instruction words as data. 3,904,863, Cl. 235-156.000.

Cochran, Robert A., to Shell Oil Company. Procedures for restart and shutdown of slurry pipelines. 3,904,248, Cl. 302-66.000.

Cochrane, Robin Adam, to Girling Limited. Hydraulic flow control assemblies. 3,903,920, Cl. 137-512.000.

Cohen, Arthur I.; Sim, James S. Y.; Van Horn, Maurice H.; Gordesky, Stanley E.; and Gordon, Stanley I., to Union Corporation. Sustained release of chlorpheniramine maleate. 3,904,745, Cl. 424-22.000.

Cohen, Elliott: *See—*
Lang, Stanley Albert, Jr.; and Cohen, Elliott, 3,904,614.

Cohen, Harold A.: *See—*
Faurschou, Donald K.; Cohen, Harold A.; Brooks, Albert H.; Alcock, Charles B.; and Monier-Williams, Craufurd S., 3,904,486.

Cohn, Lawrence P.; Turner, Larry G.; and Crawford, Dennis W., to Bristol Products, Inc. Valve construction. 3,904,169, Cl. 251-86.000.

Coir, Leo: *See—*
Meinecke, Klaus; Wilhelm, Dieter; Coir, Leo; Tillack, Jurgen; Samulowitz, Helmut; and Gebhardt, Karl, 3,904,904.

Colafati, Ralph A., III: *See—*
Schnabel, Wilhelm J.; and Colafati, Ralph A., III, 3,904,666.

Colas, Francois: *See—*
Le Grand, Robert; Freville, Christian; and Colas, Francois, 3,903,822.

Colbath, Dan L. Roll-forming machine for making articles having varying cross-sectional configurations. 3,903,723, Cl. 72-178.000.

Colgate-Palmolive Company: *See—*
Cordon, Martin; and Norfleet, James, 3,904,747.
Ramachandran, Pallassana, 3,904,359.
Suh, John T.; and Schnettler, Richard A., 3,904,680.

Collis, George C. Method and apparatus for brushing teeth. 3,903,906, Cl. 132-84.00R.

Colourvision Associates: *See—*
Sword, Geoffrey; Lawrence, John Leslie; Raggett, Stephen Richard; and Blakemore, Bernard, 3,904,819.

Colston, John R., to Westinghouse Electric Corporation. Manipulator apparatus. 3,904,042, Cl. 214-1.0CM.

Colt Industries Operating Corporation: *See—*
Pan, Pei-Tai, 3,903,813.

Colton, Russell F., to J-Tec Associates, Incorporated. Disposable respiratory parameter sensor. 3,903,742, Cl. 73-194.00B.

Columbia Industrial Developments Limited: *See—*
Logue, John; and Coulson, Michael J., 3,903,908.

Columbia Ribbon and Carbon Manufacturing Co., Inc.: *See—*
Brown, Albert E.; Schlotzhauer, Allan T.; and Newman, Douglas A., 3,904,802.
Brown, Albert E.; Schlotzhauer, Allan T.; and Newman, Douglas A., 3,904,803.

Comalco (J. & S.) Pty., Ltd.: *See—*
Jury, Harold Rex; and Howells, Ronald McKenzie, 3,903,769.

Comber, Bogdan. Light generating toy. 3,903,638, Cl. 46-1.00R.

Combustion Engineering, Inc.: *See—*
Wadsworth, Melvin Eugene, 3,904,166.

Commercial Solvents Corporation: *See—*
Hodge, Edward B., 3,904,626.

Commissariat a l'Energie Atomique: *See—*
Moulin, Maurice; Roze, Michel; and Vivien, Jean, 3,903,931.
Pfeifer, Hans, 3,904,256.

Communications Satellite Corporation (COMSAT): *See—*
Revesz, Akos George; and Dendall, Robert John, 3,904,453.

Compagnie Generale des Etablissements Michelin, raison sociale Michelin & Cie: *See—*
Boileau, Jacques, 3,904,463.

Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Lavanant, Pierre; and Jacob, Jean-Baptiste, 3,905,030.

Compensating Tension Controls, Inc.: *See—*
Taitel, Charles M.; and Ryan, Ralph L., 3,904,147.

Comperatore, John A., to PPG Industries, Inc. Treating glass sheets. 3,904,460, Cl. 156-102.000.

Compucorp: *See—*
Bottles, David M., 3,904,110.

Cone, Robert A. Electronic thermometer. 3,903,744, Cl. 73-362.0AR.

Conlan, William A., Jr.: *See—*
Gulla, Michael; and Conlan, William A., Jr., 3,904,792.

Consolidated Papers, Inc.: *See—*
Arendt, Frank P., 3,904,876.

Continental Can Company, Inc.: *See—*
Hekal, Ihab M.; and Chelton, Raymond G., 3,904,569.
Whiteside, Robert C., 3,904,072.

Continental Oil Company: *See—*
Oertle, Donald H., 3,904,264.

Control Concepts, Inc.: *See—*
Zeuner, Kenneth W., 3,903,919.

Control Data Corporation: *See—*
Davis, Ronald E., 3,904,933.
Martin, Robert F.; MacDonald, Robert D.; and Williams, C. Alan, 3,904,829.
Nickel, Donald Francis, 3,905,045.

Convertini, Ursula: *See—*
Dimigen, Heinz; and Convertini, Ursula, 3,904,462.

Conway, Alvin C.: *See—*
Hammar, Walton James; and Conway, Alvin C., 3,904,630.

Conway, Walter D.: *See—*
Minatoya, Hiroaki; Tullar, Benjamin F.; and Conway, Walter D., 3,904,671.

Cook Electric Company: *See—*
Hamrick, Oliver Henry, Jr.; Zibilich, Joseph L.; and Cwirzen, Casimir, 3,904,936.

Cooney, Frank E., to NCR Corporation. Electrical cable connector. 3,904,261, Cl. 339-17.00F.

Cooper Industries, Inc.: *See—*
Boyd, Horace Edward, 3,904,305.

Coors Porcelain Company: *See—*
Thurnauer, Hans; and Coubrough, Lawrence E., 3,904,352.

Coppola, Daniel J.: *See—*
Grambo, Lawrence C., Jr.; and Coppola, Daniel J., 3,904,097.

Corbett, George Douglas. Electromagnetic valve for wind-pipe organs. 3,903,777, Cl. 84-341.000.

Cordell, Robert Roger, to Bell Telephone Laboratories, Incorporated. Voltage controlled emitter-coupled multivibrator with temperature compensation. 3,904,989, Cl. 331-113.00R.

Cordon, Martin; and Norfleet, James, to Colgate-Palmolive Company. Dentifrice compositions. 3,904,747, Cl. 424-49.000.

Corning Glass Works: *See—*
Campbell, Larry E.; and Johnson, Robert L., 3,904,553.
Eaton, David L., 3,904,422.
Keck, Donald B.; and Olshansky, Robert, 3,904,268.
Kessler, William R., 3,904,031.

Corona, Stephen C.: *See—*
Kidd, Wayne L.; and Corona, Stephen C., 3,904,290.

Correll, Richard R. Ladder rack. 3,904,094, Cl. 224-42.10F.

Corse, Louis G., to Societe d'Etudes de Machines Speciales. Machines for interconnecting continuous webs. 3,904,142, Cl. 242-58.300.

Coubrough, Lawrence E.: *See—*
Thurnauer, Hans; and Coubrough, Lawrence E., 3,904,352.

Coughlan, Edward E., Jr.: *See—*
Thau, Lawrence W., Jr.; and Coughlan, Edward E., Jr., 3,903,722.

Coulson, Michael J.: *See—*
Logue, John; and Coulson, Michael J., 3,903,908.

Covington, Morris T., to Taft Broadcasting Corporation. Method and apparatus for detecting a break or other occurrence in a pipeline containing gas under pressure. 3,903,729, Cl. 73-40.50R.

Cowley, Gary. Drafting table. 3,903,812, Cl. 108-2.000.

Cox, Barrie Searle: *See—*
Saunders, John Allen; and Cox, Barrie Searle, 3,904,583.

Cozzarin, Virgil J.: *See—*
Kipple, Harry P.; Cozzarin, Virgil J.; and Kapperman, Francis C., deceased, 3,904,724.

Cramer, Jerry W.: *See—*
Paddock, Paul F.; and Cramer, Jerry W., 3,904,023.

Crandall, Robert E.: *See—*
Rooney, Thomas C.; and Crandall, Robert E., 3,904,714.

Craven, David Barry: *See—*
Dean, Peter Duncan Goodearl; and Craven, David Barry, 3,904,478.

Crawford, Dennis W.: *See—*
Cohn, Lawrence P.; Turner, Larry G.; and Crawford, Dennis W., 3,904,169.

Crawford, Kenneth Desmond Eddington, to Westinghouse Brake and Signal Co. Remote control braking apparatus including jerk control. 3,904,249, Cl. 303-20.000.

Crews, Roy E. Vehicle mounted battery charging system for an electric motor vehicle. 3,904,947, Cl. 320-2.000.

Critchlow, James A.: *See—*
Rees, James D.; and Critchlow, James A., 3,904,875.

Croker, David M., to United States of America, Army. Hot gas generator. 3,903,692, Cl. 60-39.710.

Cronin, George R.: *See—*
Bean, Kenneth E.; and Cronin, George R., 3,905,037.

Crosby, Kenneth R. Ecology nail-clip reservoir device. 3,903,596, Cl. 30-29.000.

Crouzet, Henri; and Dupeuble, Jean-Claude, to Ateliers Roannais de Constructions Textiles Societe. Apparatus for initiating operation of a combined drawing and texturing machine for yarn. 3,903,682, Cl. 57-34.0HS.

Csongor, Desider G. Method and apparatus for extruding melted plastic mixtures. 3,904,179, Cl. 259-191.000.

Cudby, Joseph William, to United States Steel Corporation. Jointing compositions. 3,904,566, Cl. 260-23.70M.

Cuin, David Ernest; and Shaw, Alan, to BPB Industries Limited. Wall linings. 3,903,671, Cl. 52-480.000.

Cullen, Roy H. Drilling assembly, deviation sub therewith, and method of using same. 3,903,974, Cl. 175-17.000.

Curran, John R., to Foxboro Company, The. Flow control valve. 3,904,170, Cl. 251-152.000.

Curtis, Burnell P., Jr., to Monsanto Company. Purification of methyl acetate. 3,904,676, Cl. 260-499.000.

Cutchaw, John M. Connector for leadless integrated circuit packages. 3,904,262, Cl. 339-17.0CF.

Cwirzen, Casimir: *See—*
Hamrick, Oliver Henry, Jr.; Zibilich, Joseph L.; and Cwirzen, Casimir, 3,904,936.

Cywinski, Norbert Francis: *See—*
Lo, Ching-Tsan; Miller, Joe Jed; and Cywinski, Norbert Francis, 3,904,703.

Czyzewski, Alfred, Dr.: *See—*
Boroschewski, Gerhard, Dr.; Arndt, Friedrich, Dr.; and Czyzewski, Alfred, Dr., 3,904,396.

Daebler, Donald H.; and Malmgren, Richard P., to GTE Automatic Electric Laboratories Incorporated. Apparatus for repairing hybrid circuits. 3,904,100, Cl. 228-8.000.

Daffron, Vernon M., to Wagner Electric Corporation. Logic module. 3,904,812, Cl. 174-52.00S.

Daguet, Jacques Lucien: *See—*
Bellanger, Maurice Georges; and Daguet, Jacques Lucien, 3,904,963.

Daikin Kogyo Co., Ltd.: *See—*
Satokawa, Takaomi; Fujii, Tuneo; Honda, Norimasa; Asano, Kozo; Nakamura, Yukiharu; and Suzue, Seisuke, 3,904,575.

Daimler-Benz Aktiengesellschaft: *See—*
Andres, Rudolf; and Moller, Hermann, 3,903,984.
Barenyi, Bela; Wilfert, Karl; and Renner, Hermann, 3,904,237.
Van Winsen, Friedrich H.; Sorsche, Joachim H.; and Sommer, Erwin, 3,903,982.
Wilfert, Karl; Barenyi, Bela; Haselmann, Heinrich; Scholz, Hansjurgen; Backhaus, Hans-Gerd; and Brambilla, Luigi, 3,904,223.

Daiuta, Leo R., to Lukens Steel Company. Mobile oscillating spot grinder with pressure control means to produce a feathering effect. 3,903,658, Cl. 51-170.00T.

Dalia, Salvatore A. Louver security clip. 3,903,649, Cl. 49-403.000.

Dalton, Homer L. Electric hand saw guide. 3,903,600, Cl. 30-376.000.

Dalton, Thomas B., to Westran Corporation. Hydromechanical jack. 3,904,177, Cl. 254-103.000.

D'Amico, John Joseph, to Monsanto Company. Dithiocarbamate derivatives of 1,2,4-thiadiazoles. 3,904,619, Cl. 260-246.00B.

Dancy, William B., to International Minerals & Chemical Corporation. Process for the clarification of brine. 3,904,520, Cl. 23-298.000.

Daniels, Richard William; and Kurth, Carl Ferdinand, to Bell Telephone Laboratories, Incorporated. Active resistor-capacitor filter arrangement. 3,904,978, Cl. 330-109.000.

Darras, Jean, to Societe Internationale de Vente pour l'Automobile et le Cycle. Removable engine unit arrangement for motorcycles. 3,903,980, Cl. 180-31.000.

D'Ascoli, Ralph G.: *See—*
Alleva, Leon L.; and D'Ascoli, Ralph G., 3,903,588.

Dauge, Vitaly Teodorovich; and Buznyakov, Kirill Vladimirovich. Multiholder tool head. 3,903,766, Cl. 82-36.00A.

Daum, Werner; Frohberger, Paul-Ernst; and Hamburger, Brigitte, to Bayer Aktiengesellschaft. Benzimidazol-2-yl-carbamic acid ketonoxime esters. 3,904,643, Cl. 260-309.200.

Davis, Billy K., to United States of America, General Counsel-Code GP. Solar energy power system. 3,903,699, Cl. 60-641.000.

Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., to Gulf Research & Development Company. Method of preparing fibrils having properties for making improved paper sheets. 3,904,728, Cl. 264-140.000.

Davis, Michael I.; Loffredo, John M.; Wise, Larry E.; and Rickard, Patrick L., to International Business Machines Corporation. Data acquisition and control system including dynamic interrupt capability. 3,905,025, Cl. 340-172.500.

Davis, Robert Newton: *See—*
Laverman, Royce Jay; Davis, Robert Newton; and La Fave, Ivan Vallier, 3,903,824.

Davis, Ronald E., to Control Data Corporation. Cooling apparatus for electronic modules. 3,904,933, Cl. 317-100.000.

Davis, William C.: *See—*
Robinson, C. Paul; Jensen, Reed J.; Davis, William C.; and Sullivan, John A., 3,904,985.

Dawson, Robert H.; and McGrath, James L., to Reliable Electric Company. Fluid-pressure operated splice for electrically conductive gables. 3,904,814, Cl. 174-84.00R.

Day, John T.; Waugh, Richard; Lorz, Emil; and Lyle, Dennis W., to Syntex Corporation. Process for the resolution of d- and l-2-(6-methoxy-2-naphthyl) propionic acid. 3,904,683, Cl. 260-520.000.

Dean, Peter Duncan Goodearl; and Craven, David Barry. Immobilized co-enzymes. 3,904,478, Cl. 195-63.000.

De Baan, Johannes Jasper: *See—*
Adrian, Adolf; and De Baan, Johannes Jasper, 3,904,002.

DeBaillie, Arnold A.: *See—*
Sorenson, Charles E.; Reynolds, James E.; and DeBaillie, Arnold A., 3,903,679.

Decca Limited: *See—*
Jones, William Leslie; and Banks, Malcolm James Peter, 3,904,466.

Decker, Alfred, to Centre de Recherches Metallurgiques - Centrum voor Research in de Metallurgie. Manufacturing pig iron in a blast furnace. 3,904,398, Cl. 75-42.000.

Decor, Jean-Pierre; and Goletto, Jean, to Rhone-Poulenc S.A. 1-Isocyanato-2-isocyanatomethyl-cyclopentane. 3,904,665, Cl. 260-453.00A.

Deen, Peter J.: *See—*
Van Doorn, Petrus J. J.; Van Gestel, Antonius J. J.; and Deen, Peter J., 3,903,964.

Deere & Company: *See—*
Tsuchiya, William Sadayuki; and Schnittjer, Bradley Joseph, 3,904,051.

Deering Milliken, Inc.: *See—*
Priester, Amos U., Jr., 3,904,793.

Dega, Robert L., to General Motors Corporation. Rotary face seal. 3,904,211, Cl. 277-32.000.

Degawa, Takashi: *See—*
Kishi, Atsuo; and Degawa, Takashi, 3,904,320.

de Haij, Nicolaas A.: *See—*
Hendrickx, Andreas J. J.; and de Haij, Nicolaas A., 3,904,695.

Dekker, Charles, to Anchor Bolt and Screw Company. Self-countersinking fastener head. 3,903,784, Cl. 85-43.000.

Delagrange, Arthur D., to United States of America, Navy. Automatic gain control amplifier circuit. 3,904,971, Cl. 330-29.000.

Delarge, Jacques E.; Thunus, Leopold; Lapiere, Albert; and Georges, Andre, to A. Christiaens Societe Anonyme. 3-Sulfonamido-4-phenyl aminopyridines and derivatives. 3,904,636, Cl. 260-294.80F.

Delfosse, Pierre; and Bosshard, Alfred, to Pluss-Staufer AG. Mill for grinding minerals. 3,904,130, Cl. 241-30.000.

De Ligt, John, to Westvaco Corporation. Small roll, thin belt embossing apparatus. 3,903,791, Cl. 101-23.000.

De Ligt, John, to Westvaco Corporation. Accordion, folding and cutting apparatus. 3,904,186, Cl. 270-61.00F.

DeLorean, John Z., to John A. DeLorean Corporation. Racket. 3,904,202, Cl. 273-73.00E.

Demagny, Daniel. Pleating machine. 3,904,089, Cl. 223-30.000.

Demaine, David George Anthony; and Hall-Jackson, John Allan, to Rank Organisation Limited, The. Optical arrangement. 3,904,873, Cl. 250-227.000.

Den-Tal-Ez Mgf., Co.: *See—*
Swatman, Donald R., 3,904,841.

Den Boer, Cornelis Gerardus, to International Tools. Molding apparatus for safety caps. 3,904,165, Cl. 249-67.000.

Dendall, Robert John: *See—*
Revesz, Akos George; and Dendall, Robert John, 3,904,453.

Dendinger, Lawrence P.: *See—*
Gakhar, Ved P.; and Dendinger, Lawrence P., 3,903,927.

Denley, Ronald S., to Teletype Corporation. Ink ribbon mechanism and cartridge for impact printers. 3,904,018, Cl. 197-168.000.

Dennison, Edward S.: *See—*
Cercone, Ronald; and Dennison, Edward S., 3,904,436.

Dennison, William T., to United Technologies Corporation. Gas generator turbine cooling scheme. 3,904,307, Cl. 415-115.000.

De Noyer, Donald B., to Beloit Corporation. Granulator with improved accessibility. 3,904,136, Cl. 241-186.00A.

Department of Registration and Education of the State of Illinois: *See—*
Larson, Thurston E.; Lane, Russell W.; and Neff, Chester H., 3,904,365.

de Paulis, Tomas: *See—*
Carnmalm, Bernt Sigfrid Emanuel; de Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 3,904,691.

Dergachev, Fedor Matveevich: *See—*
Afanasiev, Alexandr Dmitrievich; Lykov, Alexei Gavrilovich; Mogilevsky, Alexandr Moisceevich; Sokolov, Leonid Pavlovich; Fridman, Evl Gershkovich; and Dergachev, Fedor Matveevich, 3,904,729.

Derible, Pierre Henri; Humbert, Daniel; and Dumont, Claude, to Rousel-UCLAF. Novel benzyloxysulfamides. 3,904,586, Cl. 260-556.00N.

Deschenes, Roger, to WABCO Westinghouse. Arrangement of resilient diaphragm acting as a valve seat and separating adjacent pressure chambers. 3,904,175, Cl. 251-331.000.

Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See*—
Isaac, Otto, 3,904,598.
Trebinger, Karl; and Kallrath, Gottfried, 3,904,787.

de Veer, Johannes D., to American Optical Corporation. Compensating plate to provide uniformity in interference microscopes. 3,904,267, Cl. 350-12.000.

Dey, Arabinda N.; and Holmes, Robert W., to P. R. Mallory & Co., Inc. Metal permanganate and metal periodate organic electrolyte cells. 3,904,432, Cl. 136-6.0LN.

Deyerle, William Minor. Acetabular cup prosthesis component for total or subtotal hip prosthesis system. 3,903,549, Cl. 3-1.912.

Diamond, John A.; Sylvester, Amedeo A.; and Carver, Fred F., to Singer Company, The. Apparatus for simulating aircraft control loading. 3,903,614, Cl. 35-12.00S.

Dian, Walter, to Beatrice Foods Co. Bicycle derailler with overload cable protection means. 3,903,751, Cl. 74-217.00B.

Di Cecco, Enio; and Totti, Mario, to Safe Electronic Systems A.G. Electronic circuit by which electric current is fed to spark plugs of an engine. 3,903,861, Cl. 123-148.00E.

Dicks, Andrew Leslie, to British Gas Corporation. Catalyst of ruthenium and zinc oxide on alumina carrier for steam reforming hydrocarbons. 3,904,554, Cl. 252-466.0PT.

Dickstein, George, to Sports Products Corporation. Method of making a bonded helmet structure. 3,904,469, Cl. 156-245.000.

Dictran International Corporation: *See*—
Murata, Masamichi; Urayama, Yuji; and Furusawa, Takamasa, 3,904,826.

Diehl datensysteme G.m.b.H.: *See*—
Klein, Friedrich, 3,905,021.

Dienes, Andrew; Shank, Charles Vernon; and Trozzolo, Anthony Marion, to Bell Telephone Laboratories, Incorporated. Broad band exciplex dye lasers. 3,904,982, Cl. 331-94.50L.

Digital Equipment Corporation: *See*—
McNamara, John E., 3,904,861.

DiLorenzo, James Vincent; and Luther, Lars Christian, to Bell Telephone Laboratories, Incorporated. Growth technique for high efficiency gallium arsenide impatt diodes. 3,904,449, Cl. 148-175.000.

Dimigen, Heinz; and Convertini, Ursula, to U.S. Philips Corporation. Method of manufacturing etched structures in substrates by ion etching. 3,904,462, Cl. 156-13.000.

Dinerman, David. Spray-gun cleaners. 3,904,431, Cl. 134-88.000.

DiPaolo, Edmund C. Toothbrush sterilization holder and container. 3,904,362, Cl. 21-87.000.

Director-General of the Agency of Industrial Science & Technology: *See*—
Tanaka, Yoshio; Kato, Masao; Okada, Akira; and Shimura, Yukio, 3,904,587.

Dirstine, John T. Firing mechanism for a cartridge firing device. 3,903,630, Cl. 42-65.000.

Disston, Inc.: *See*—
Jones, John E.; Lineback, Lynn D.; and Sherrill, Charles F., 3,904,116.

Ditlinger, Richard J., to Bendix Corporation, The. Extensible brake adjuster and reset apparatus. 3,903,999, Cl. 188-196.00R.

Dixon, William D.: *See*—
Eilrich, Gary L.; and Dixon, William D., 3,904,395.

Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., to Pitney-Bowes, Inc. Feed back control system for a postage meter. 3,904,946, Cl. 318-685.000.

Dobo, Emerick J., to Monsanto Company. Cast metal wire of reduced porosity. 3,904,381, Cl. 29-193.000.

Dobson, Thomas A.: *See*—
Pelz, Karel; and Dobson, Thomas A., 3,904,617.

Dr. -Ing. H.c.F. Porsche K.G., Firma: *See*—
Hetmann, Richard, 3,904,300.

Dr. Ing. Rudolf Hell: *See*—
Taudt, Heinz; and Keller, Hans, 3,904,816.

Dodd, Malcolm J., to Universal Oil Products Company. Seating unit with removable life preserver section. 3,903,554, Cl. 9-7.000.

Dodson, Edith Margaret, to National Research Development Corporation. Methods of and apparatus for determining trace impurities. 3,904,364, Cl. 23-230.00R.

Doench, Thomas Judson, to Omnifac Corporation. Power supply warning device for marine and land vehicles. 3,905,014, Cl. 340-52.00D.

Doherty, Thomas E.: *See*—
Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., 3,903,768.

Dokunikhin, Nikolai Stepanovich; Vorozhtsov, Georgy Nikolaevich; and Sarycheva, Valentina Petrovna. 3,4,9,10-Anthanthronetetracarboxylic acid, its anhydride and method of producing same. 3,904,650, Cl. 260-345.200.

Dolhyj, Serge R.: *See*—
Milberger, Ernest C.; and Dolhyj, Serge R., 3,904,653.

Dollinger, Robert E., to Phillips Petroleum Company. Method of pelleting carbon black. 3,904,727, Cl. 264-117.000.

Donath, Ernest E.: *See*—
Graboski, Michael S.; and Donath, Ernest E., 3,904,386.

Donnelly, Thomas H.; and McGinnis, Robert S., to Swift & Company. Preparation of water soluble gelatin. 3,904,771, Cl. 426-576.000.

Doriel, Joseph. Module unit building structure and method of erecting it. 3,903,664, Cl. 52-79.000.

Dorr-Oliver Incorporated: *See*—
Barton, William W.; and Heath, Thomas D., 3,904,549.

Dorsey, Lewis, to Dorsey, Robert Alan. Collapsible trap. 3,903,637, Cl. 43-105.000.

Dorsey, Robert Alan: *See*—
Dorsey, Lewis, 3,903,637.

Doss, Nagib A., to Allied Chemical Corporation. Cationic anthraquinone dyes. 3,904,660, Cl. 260-380.000.

Dotsko, Martin, to Singer Company, The. Visual display apparatus. 3,903,615, Cl. 35-12.00N.

Double A Products Company: *See*—
Loup, Ronald L.; and Walker, Samuel C., 3,903,923.

Douglas, Bruce E. Technique for measuring the complex shear modulus utilizing laser interferometry. 3,903,734, Cl. 73-99.000.

Douma, William L.: *See*—
Huston, Paul O.; Douma, William L.; and Gandi, Robert A., 3,903,884.

Doyle, Dennis D. Tape cutter. 3,904,095, Cl. 225-56.000.

Doyle, William J.: *See*—
Farrell, R. Paul, Jr.; Grace, Richard C.; and Doyle, William J., 3,904,131.

Dreher, Karl: *See*—
Steinberger, Siegfried; Nagel, Erich; Biedermann, Ernst; Pflugbeil, Mathias; Dreher, Karl; and Fleck, Adolf, 3,904,145.

Dresser Industries, Inc.: *See*—
Berry, Robert Frank, 3,904,233.
Pugh, Toby S.; and Blackwell, Henry W., 3,904,212.

Drummond, Peter R., to Xerox Corporation. Back wiring. 3,903,937, Cl. 140-147.000.

Dubner, Benjamin B. Conforming supportive innersole device. 3,903,621, Cl. 36-44.000.

du Chaffaut, Jean Amaudric; Hondermarck, Jean Claude; and Laine, Bernard Maurice, to British Petroleum Company Limited, The. Purification of a micro-organism. 3,904,485, Cl. 203-56.000.

Duchon, Yves Bernard; and Optyker, Georges Jacques, to Furprocess Licensing Co. Inc. Manufacture of fur articles. 3,903,716, Cl. 69-22.000.

Dueker, James E.; and Glaenzer, Richard H., to United States of America, Navy. Target locating circuit using a lateral photoelectric diode. 3,904,871, Cl. 250-211.00J.

Duistermaat, Jan Hendrik, to U.S. Philips Corporation. Cathode ray tube display screen having overlapping triad elements and separated triads. 3,904,912, Cl. 313-408.000.

Dumont, Claude: *See*—
Derible, Pierre Henri; Humbert, Daniel; and Dumont, Claude, 3,904,586.

Dunlop Limited: *See*—
French, Tom; and Martin, Erwin Herbert Erhard, 3,903,946.

Dunn, John Robert: *See*—
Lasis, Evalds; Buckler, Ernest Jack; and Dunn, John Robert, 3,904,580.

Dunn, John William, to Owens-Corning Fiberglas Corporation. Apparatus for depositing materials on surfaces of revolution. 3,904,339, Cl. 425-162.000.

Dunn, Kathy A., to Marvin Glass & Associates. Changeable hair doll. 3,903,640, Cl. 46-135.00R.

Dunnery, David A.: *See*—
Atwood, Gilbert R.; Blake, Robert J.; Butwell, Kenneth F.; and Dunnery, David A., 3,904,735.

Dupeuble, Jean-Claude: *See*—
Crouzet, Henri; and Dupeuble, Jean-Claude, 3,903,682.

du Pont de Nemours, E. I., and Company: *See*—
Blackwell, John; and Peavy, Richard Edwin, 3,904,596.
Greene, Robin N., 3,904,588.
Hoeschele, Guenther Kurt, 3,904,706.
Husky, C. George; Resler, Charles J., Jr.; and Sanders, Sidney C., 3,904,725.
Hutton, David Glenn; and Robertaccio, Francis Leonard, 3,904,518.
James, Daniel Shaw, 3,904,358.
Kane, William Paul, 3,904,104.
Logothetis, Anestis Leonidas, 3,904,590.
Martin, Elmore Louis, 3,904,667.
Rosenlund, Iver Theodore, 3,904,374.
Waggoner, Marion Glen, 3,904,806.

Duro-Test Corporation: *See*—
Emidy, Thomas J.; Northrop, Donald P.; Thorington, Luke; and Olsen, Andrew Henry, 3,904,916.

Durr, Helmut E.; and Haller, Albert H., to Western Electric Company, Incorporated. Apparatus for material insertion. 3,903,940, Cl. 141-32.000.

Duy, Thuoc Nguyen: *See*—
Amingual, Daniel; Duy, Thuoc Nguyen; and Riant, Yves, 3,904,879.

Duzinkas, Donald R.: *See*—
Allegretti, Anthony J.; and Duzinkas, Donald R., 3,904,055.

Dybas, Robert J.: *See*—
Beltran, Adrian M.; and Dybas, Robert J., 3,904,101.

Dyform Concrete (Prestressed) Ltd.: *See*—
Putti, George, 3,904,341.

Dymsza, Henry A., to Board of Regents for Education of the State of Rhode Island. Food preserving process. 3,904,774, Cl. 426-321.000.

Dynamit Nobel Aktiengesellschaft: *See*—
Klein, Gerd; and Schmoll, Kurt, 3,904,573.

Schultz, Neithart; Vahlensieck, Hans-Joachim; and Gebele, Rudolf, 3,904,701.

Dytap Construction Holdings Ltd.: *See*—
Appleton, Samuel Alan, 3,903,702.

E. R. Squibb & Sons, Inc.: *See*—
Lee, Bong Kuk; Neidleman, Saul Lewis; and Ryu, Dewey D. Y., 3,904,604.

E. W. Scripps Company, The: *See*—
Niehaus, William R., 3,904,960.

Earle, John L. Source sensing battery charger. 3,904,948, Cl. 320-13.000.

Eastman, Fred; Giacobello, Bartolo J.; and Rubens, Roger W., to National Starch and Chemical Corporation. Process for preparing dried, precooked starch products with microwaves. 3,904,429, Cl. 127-71.000.

Eastman Kodak Company: *See*—
Hunter, C. Shelburn, 3,904,420.
Lincoln, Lewis L.; and Heseltine, Donald W., 3,904,637.
Mowrey, Rowland George, 3,904,413.
Mowrey, Rowland George; and Ponticello, Ignazio Salvatore, 3,904,418.
Oftedahl, Edwin N., 3,904,415.
VanIngen, Jack A.; Maddocks, Roger H.; and Carter, Arthur L., 3,904,392.
Wasco, Walter C.; Pierson, Charles W.; and Pagnard, Leonard E., 3,904,474.

Eastmond, Bruce C., to Motorola, Inc. Audio periodicity squelch system. 3,904,969, Cl. 325-478.000.

Easton, Wayne B. Trigonometric computer. 3,903,607, Cl. 33-76.00R.

Easy Heat-Wirekraft, MSP Industries Corporation: *See*—
Adams, Gerald E., 3,904,847.

Eaton Corporation: *See*—
Braun, Eugene R.; and Richards, Elmer A., 3,904,007.

Eaton, David L., to Corning Glass Works. Porous glass support material. 3,904,422, Cl. 106-40.00V.

Ebukuro, Rinzou; Isono, Tomoyuki; and Omiya, Tetsuo, to Nippon Electric Company Limited. Detector for luminescent patterns comprising a color detector responsive to color components of predetermined colors of the luminescence. 3,904,872, Cl. 250-226.000.

Echtler, Sigmund. Air-supported pavilion. 3,903,659, Cl. 52-2.000.

Eckert, Hans Werner; Flemming, Peter; and Giede, Karl, to Therachemie Chemisch-Therapeutische Gesellschaft mbH. Hair cosmetic preparation. 3,904,748, Cl. 424-70.000.

Ede, Ainsley Neville. Flexible hose pipes. 3,903,917, Cl. 137-355.120.

Eder, Hans: *See*—
Krauss, Otto; Eder, Hans; Niederhametner, Peter; Richter, Arend; and Zimmermann, Norbert, 3,904,010.

Edwards, Claude: *See*—
Edwards, Thomas C.; and Edwards, Claude, 3,904,327.

Edwards, John J., to Syntex Corporation. Preparation of 17α-propadienyl steroids. 3,904,611, Cl. 260-239.55R.

Edwards, Thomas C.; and Edwards, Claude, to Rovac Corporation, The. Rotary compressor-expander having spring biased vanes. 3,904,327, Cl. 418-8.000.

Egger, Hermann. Procedure and a device for the sterilization of packaging material. 3,904,361, Cl. 21-57.000.

Eggermont, Frans: *See*—
Geirhos, Werner; and Eggermont, Frans, 3,904,855.

Egli, Christian: *See*—
Eichenberger, Kurt; and Egli, Christian, 3,904,681.

Egyt Gyogyszervegyeszeti Gyar: *See*—
Budai, Zoltan; Pallos, Laszlo; Petocz, Lujza E.; and Kosoczky, Ibolya, 3,904,628.

Ehling, Theodore P.; Plaza, Alexander; and Ruehli, Albert E., to International Business Machines Corporation. Voltage distribution systems for integrated circuits. 3,904,886, Cl. 307-89.000.

Eichenberger, Kurt; and Egli, Christian, to Ciba-Geigy Corporation. Propionic acid. 3,904,681, Cl. 260-519.000.

Eilingsfeld, Heinz: *See*—
Bantel, Karl-Heinz; and Eilingsfeld, Heinz, 3,904,659.

Eilrich, Gary L.; and Dixon, William D., to Monsanto Company. 2-Imino derivatives of substituted imidazoles. 3,904,395, Cl. 71-92.000.

Eisai Co., Ltd.: *See*—
Yoshizawa, Masayuki; Araki, Kengo; Koide, Atsushi; and Matsuoka, Yoshitaka, 3,904,479.

Eisenberg, Bernard C., to Solbern Corporation. Machine and method for filling containers to a predetermined level. 3,903,941, Cl. 141-78.000.

El Paso Products Company: *See*—
Lo, Ching-Tsan; Miller, Joe Jed; and Cywinski, Norbert Francis, 3,904,703.

Elder, Jerome Earl, to International Paper Company. Carton. 3,904,106, Cl. 229-31.00R.

Electrochem, Inc.: *See*—
Cercone, Ronald; and Dennison, Edward S., 3,904,436.

Elge Establishment: *See*—
Marocco, Antonio, 3,904,168.

Elger, John Herbert: *See*—
Schaefer, George Henry; and Elger, John Herbert, 3,904,073.

Eli Lilly and Company: *See*—
Baker, Patrick J., 3,904,605.
Higgins, Harvey M., Jr.; and Fitzsimmons, Jon W., 3,904,615.
Hull, Robert N.; and Huseby, Rolf M., 3,904,480.
Pioch, Richard P., 3,904,618.
Slater, Irwin H., 3,904,757.

Elkem-Spigerverket A/S: *See*—
Krogsrud, Harald, 3,903,748.

Elliott, Douglas Ernest; and Virr, Michael John. Fuel-burning heater. 3,903,846, Cl. 122-4.000.

Elofsson, Kjell: *See*—
Van Santen, Aart; and Elofsson, Kjell, 3,904,048.

Elslager, Edward F.; and Worth, Donald F., to Parke, Davis & Company. Novel thioxanthenone compounds and means of producing the same. 3,904,631, Cl. 260-268.0TR.

Elsner, Edwin C.: *See*—
Evans, Bruce B.; and Elsner, Edwin C., 3,903,584.

Eltra Corporation: *See*—
Badger, John P., 3,904,441.

Emerson Electric Co.: *See*—
Repp, John M.; and Brown, Frank C., 3,904,030.

Emerson, Roy J., to General Tire & Rubber Company, The. Puncture sealing means for pneumatic tires. 3,903,947, Cl. 152-347.000.

Emidy, Thomas J.; Northrop, Donald P.; Thorington, Luke; and Olsen, Andrew Henry, to Duro-Test Corporation. End cap structures for fluorescent lamps. 3,904,916, Cl. 313-493.000.

Endo, Hiroshi: *See*—
Suzuki, Shigeyuki; Kaneda, Isamu; Endo, Hiroshi; Miyata, Kazuo; Horiguchi, Tadao; and Yamamoto, Kazumasa, 3,904,687.

Energy Systems, Inc.: *See*—
Lund, Norman; Bialy, Karol J.; Mann, Leland A.; and Woodbridge, David D., Dr., 3,904,882.

Eng, Jeffrey D.; and Harke, Cyril J., to Hooker Chemicals & Plastics Corporation. Electrolytic-electrodialytic and chemical manufacture of chlorine dioxide, chlorine and chloride-free alkali metal hydroxide. 3,904,495, Cl. 204-93.000.

Eng, Jeffrey D.: *See*—
Harke, Cyril J.; and Eng, Jeffrey D., 3,904,496.

Engelhard Minerals & Chemicals Corporation: *See*—
Kenson, Robert E.; Albert, Henry J.; and Accinno, Dante J., 3,904,740.

English, Edward: *See*—
Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, 3,903,879.

English, Michael John: *See*—
Woollons, David John; and English, Michael John, 3,903,897.

Entreprise de Recherches et d'Activities Petrolieres (ELF): *See*—
Marchal, Philippe Albert Hippolyte; Simonnet, Jacques Louis Paul; and Verrien, Jean Prudent Fernand Rene, 3,904,514.

Environment/One Corporation: *See*—
Farrell, R. Paul, Jr.; Grace, Richard C.; and Doyle, William J., 3,904,131.

Eppe, Rudolf: *See*—
Pfeifer, Josef; Abbe, Gunter; Eppe, Rudolf; Ettelbruck, Rudiger; and Schnall, Gunther, 3,904,192.

Erickson, Floyd B.; Heimsch, Robert A.; and Reaville, Eric T., to Monsanto Company. Photoimaging and color proofing. 3,904,411, Cl. 96-28.000.

Erion, Jeffrey A., to Ford Motor Company. Electromagnetically controlled seat belt retractor mechanism. 3,904,146, Cl. 242-107.400.

Erlandsson, Leif Urban; and Alsenhag, Lennart Roland, to Pool Guard Inc. A.B. Protective device for a basin. 3,903,552, Cl. 4-172.000.

Ernst Leitz G.m.b.H.: *See*—
Hock, Fromund; Heitmann, Knut; and Kaul, Dietmar, 3,904,295.

Essex International, Inc.: *See*—
Arick, Robert E.; and Vogel, Ralph A., 3,903,933.

Estep, Gordon J.; and Burton, Bernard Lee, to Bendix Corporation, The. Method of manufacturing solderable thin film microcircuit with stabilized resistive films. 3,904,461, Cl. 156-11.000.

Estey Dynamics Corporation: *See*—
Waldron, John W.; and Harvey, James E., III, 3,904,930.

Ethyl Corporation: *See*—
Plonsker, Larry; and Malec, Robert E., 3,904,595.

Ettelbruck, Rudiger: *See*—
Pfeifer, Josef; Abbe, Gunter; Eppe, Rudolf; Ettelbruck, Rudiger; and Schnall, Gunther, 3,904,192.

Ettinger, Donald H.: *See*—
Sweeney, Theodore J.; and Ettinger, Donald H., 3,903,582.

Evalds, Egils, to Athena Controls Inc. Self synchronizing zero crossover switching circuit. 3,904,952, Cl. 323-24.000.

Evans, Bruce B.; and Elsner, Edwin C., to Aeroquip Corporation. Method of manufacture of spring for composite sealing ring. 3,903,584, Cl. 29-450.000.

Evans, Jetta Sue. Educational device. 3,903,617, Cl. 35-35.00J.

Evans, Leo G.: *See*—
Ruthel, Walter W.; and Evans, Leo G., 3,904,504.

Evans Products Company: *See*—
Guthrie, Bernard M., 3,904,423.

Evans, William Joshua; Grant, Wesley Norman; and Murphy, Bernard Thomas, to Bell Telephone Laboratories, Incorporated. Method of fabricating injection logic integrated circuits using oxide isolation. 3,904,450, Cl. 148-175.000.

Every, Robert H., Sr.; and McCabe, Edward J., to Mek-Tronix Laboratories. Call tracing and identification system. 3,904,830, Cl. 179-18.0FH.

Exley, John T., to Avco Corporation. Radial flow compressors. 3,904,312, Cl. 415-181.000.

Exxon Production Research Company: *See*—
Beck, Robert W.; and Finn, Lyle D., 3,903,705.
Kostelnicek, Richard J., 3,904,840.
Matthews, Jamie F., Jr., 3,903,728.
Matthews, Jamie F., Jr.; and McDonald, William M., 3,903,730.

Exxon Research and Engineering Company: *See*—
Fischer, Wilbur F., 3,904,591.
Metro, Stephen J.; Shaub, Harold; and Tao, Frank, 3,904,536.
Oswald, Alexis A.; and Valint, Paul L., Jr., 3,904,710.
Oswald, Alexis A.; and Schmit, George N., 3,904,711.
Pagel, John F., 3,904,744.
Pine, Lloyd A., 3,904,550.
Robson, Harry E., 3,904,738.
Sinfelt, John H.; and Carter, James L., 3,904,510.

Fa Grosse Webereimaschinen GmbH: *See*—
Geirhos, Werner; and Eggermont, Frans, 3,904,855.

Factory Mutual Research Corporation: *See*—
Livingston, William L., 3,903,968.

Fagan, Frank N.; Penick, Joe E.; and Schatz, Klaus W., to Mobil Oil Corporation. Regenerating catalyst with tangential introduction and circumferential swirl in a fluidized bed. 3,904,548, Cl. 252-417.000.

Failli, Amedeo; and Gotz, Manfred, to American Home Products Corporation. 4-Alkyl cycloalkyl-1-piperazino-imidazolidin-2-ones or thiones. 3,904,629, Cl. 260-268.00N.

Fairbanks Company, The: *See*—
Naylor, Alexander L., 3,904,173.

Fairbanks, Henry N.; and McCutcheon, James T., to Itek Corporation. Printing plate transfer and support apparatus. 3,904,188, Cl. 271-3.000.

Fallon, Joseph Rogers, to Western Electric Company, Incorporated. Trunk circuit for crossbar switching systems. 3,904,832, Cl. 179-18.00F.

Fane, William; Potter, Dennis; and Potschka, Joseph, to Norris Industries, Inc. Two stage lock. 3,904,230, Cl. 292-49.000.

Farfisa S.p.A.: *See*—
Aliprandi, Lucio Mario, 3,903,780.

Farmery, Horstine. Agriculture spray booms. 3,904,118, Cl. 239-165.000.

Farmitalia Societa Farmaceutici Italia: *See*—
Arcari, Giuliana; Bernardi, Luigi; Glasser, Alfredo; and Patelli, Bianca, 3,904,634.

Farney, George K.; and Gerard, William A., to Varian Associates. Rotary tuner for a circular electric mode crossed field tube. 3,904,919, Cl. 315-39.610.

Farrell, R. Paul, Jr.; Grace, Richard C.; and Doyle, William J., to Environment/One Corporation. Pressure sewer system. 3,904,131, Cl. 241-46.020.

Faulkenberry, Jack H. Collapsible campers cupboard. 3,904,258, Cl. 312-6.000.

Faurschou, Donald K.; Cohen, Harold A.; Brooks, Albert H.; Alcock, Charles B.; and Monier-Williams, Craufurd S., to Canadian Patents and Development Limited. Oxygen probe with self-contained source of oxygen gas, method of use and oxygen generating composition therefor. 3,904,486, Cl. 204-1.00T.

Faxon, James L.: *See*—
Kamm, Vernon C.; Ioannou, John T.; and Faxon, James L., 3,904,822.

Federighi, George J.: *See*—
Noren, Tore H.; and Federighi, George J., 3,903,909.

Fehr, George V. Weighted clamp for handling buoyant materials under water. 3,904,235, Cl. 294-106.000.

Fehr, Jakob: *See*—
Neff, Engelbert; and Fehr, Jakob, 3,904,078.

Feinleib, Julius; and Lipson, Stephen G., to Itek Corporation. Monolithic piezoelectric wavefront phase modulator. 3,904,274, Cl. 350-161.000.

Fenske, Horst: *See*—
Hertrich, Klaus; and Fenske, Horst, 3,904,187.

Ferch, Werner, to Casavant Freres Limited. Coupling and actuation circuit for a multi-keyboard instrument. 3,903,778, Cl. 84-341.000.

Fiat Societa per Azioni: *See*—
Franzi, Ricardo, 3,904,252.
Sola, Alberto, 3,903,852.

Fier, Raymond L., to TWM Manufacturing Company, Inc. Compact high strength auxiliary lift axle suspension system. 3,904,220, Cl. 280-124.00F.

Fierro Esponja, S.A.: *See*—
Celada, Juan; MacKay, Patrick W.; Martinez, Enrique Ramon; Villasenor, Antonio; and Viramontes, Ricardo, 3,904,397.

File, Robert H. Mail delivery signal with flexible adapter. 3,904,108, Cl. 232-35.000.

Fils, Sidney. Waterproofing apparatus. 3,904,123, Cl. 239-271.000.

Finn, Lyle D.: *See*—
Beck, Robert W.; and Finn, Lyle D., 3,903,705.

Firestone Tire & Rubber Company, The: *See*—
Laughlin, William Patrick, 3,904,457.

Firman, Carl M., to United States of America, Navy. Synchronized turn-off of VLF antennae. 3,904,966, Cl. 325-163.000.

Firmenich SA: *See*—
Becker, Joseph J., 3,904,651.

First National Bank of Nevada, Executor of the Estate of David Torr: *See*—
Torr, David, deceased, 3,903,889.

Fischer, Adolf: *See*—
Kiehs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, 3,904,673.

Fischer, Ronald H.; Milstein, Donald; and Peters, Alan W., to Mobil Oil Corporation. Hydrofinishing of petroleum. 3,904,513, Cl. 208-264.000.

Fischer, Wilbur F., to Exxon Research and Engineering Company. Primary accelerators for sulfur-cured elastomers. 3,904,591, Cl. 260-79.50B.

Fish, Aaron M., to Unican Security Systems, Ltd. Door locking device. 3,903,718, Cl. 70-156.000.

Fitzpatrick, Don W., to Reed Devices, Inc. Terminal strip. 3,904,266, Cl. 339-198.00R.

Fitzpatrick, John Douglas, to Basic Sciences, Incorporated. Well bottom hole status system. 3,905,010, Cl. 340-18.0NC.

Fitzsimmons, Jon W.: *See*—
Higgins, Harvey M., Jr.; and Fitzsimmons, Jon W., 3,904,615.

Flanagan, James C.: *See*—
Freeland, Harold L.; and Flanagan, James C., 3,903,788.

Flatt, Joseph; LoPiccolo, Robert C.; and Linsker, Eugene, to Tech Development Inc. Tip turbine inflating device. 3,904,324, Cl. 417-355.000.

Fleck, Adolf: *See*—
Steinberger, Siegfried; Nagel, Erich; Biedermann, Ernst; Pflugbeil, Mathias; Dreher, Karl; and Fleck, Adolf, 3,904,145.

Flemming, Peter: *See*—
Eckert, Hans Werner; Flemming, Peter; and Giede, Karl, 3,904,748.

Flowers, Dervin L.; and Rice, V. Louise, to Motorola, Inc. Semiconductor wafer corrosion protection and solution therefor. 3,904,784, Cl. 427-82.000.

Fluidtech Corporation: *See*—
Osheroff, Gene W., 3,904,310.

FMC Corporation: *See*—
Wilson, Donald C., 3,904,517.

FMN Schuster & Co.: *See*—
Hermanns, Peter, 3,904,140.

Fogg, Sidney George; and Walker, David John, to BP Chemicals International Limited. Blend of two chloroprene polymers. 3,904,576, Cl. 260-33.8UA.

Foik, Adolf, to Gewerkschaft Eisenhutte Westfalia. Tunneling shields. 3,903,707, Cl. 61-85.000.

Foldes, Andrew. Eddy current propulsion system. 3,903,808, Cl. 104-148.0LM.

Food Automation-Service Techniques, Inc.: *See*—
Rivelli, Louis E.; and Barnes, Miles J., 3,904,852.

Ford, John B. Earth anchors. 3,903,626, Cl. 40-10.00C.

Ford Motor Company: *See*—
Aquino, Charles F.; and Sterner, Melvin F., 3,903,859.
Erion, Jeffrey A., 3,904,146.
Guerriero, Charles P., 3,904,219.

Fork, Frank W., to H. H. Robertson Company. Access arrangement for an electrical wiring distributing floor structure. 3,903,666, Cl. 52-221.000.

Forrer, Homer W., to Mead Corporation, The. Fully enclosed bottle container. 3,904,036, Cl. 206-427.000.

Foseco International Limited: *See*—
Hawthorne, Peter Frederick, 3,904,427.

Fossan, Kare Ragnvald; and Wetterholm, Gustav Allan, to Nitro Nobel AB. Method for the stabilization of aqueous solutions of nitroform and stabilized such solutions. 3,904,452, Cl. 149-74.000.

Foster, Jack D.: *See*—
Moreno, Frederick E.; Kirk, Russell F.; and Foster, Jack D., 3,904,983.

Fournet, Jean: *See*—
Jacquelin, Guy; and Fournet, Jean, 3,904,726.

Fowler, Alexander; and Fowler, Joseph M. Shear feeding system to front gauges using magnetic delivery means and a vertically yielding support table. 3,903,770, Cl. 83-71.000.

Fowler, Joseph M.: *See*—
Fowler, Alexander; and Fowler, Joseph M., 3,903,770.

Fox, Anthony. Rocket motor housing. 3,903,693, Cl. 60-200.00R.

Fox, Leonard P.: *See*—
Nosker, Richard William; and Fox, Leonard P., 3,904,488.

Foxboro Company, The: *See*—
Curran, John R., 3,904,170.

Fraioli, Donato M., to Air-Tech Industries, Inc. Cable clamp. 3,903,574, Cl. 24-243.0CR.

Frank, Egon, to Loewe-Opta GmbH. Tape track-playback head alignment arrangement for a helical scan video recorder. 3,905,043, Cl. 360-77.000.

Frank, Marshall E., to Standard Oil Company (Indiana). Recycle process for oxidation of N-butane to maleic anhydride. 3,904,652, Cl. 260-346.800.

Frankel, Milton B.; and Rowley, Gerald L., to Rockwell International Corporation. Energetic polynitro-halogenated aliphatic esters. 3,904,674, Cl. 260-485.00F.

Franklin Manufacturing Company: *See*—
Puterbaugh, Richard L., 3,904,721.

Franzi, Ricardo, to Fiat Societa per Azioni. Vehicle hydraulic brake systems. 3,904,252, Cl. 303-22.00R.

Frazier, Wallace N. Storage battery having spiral electrodes. 3,904,433, Cl. 136-14.000.

Frechette, Thomas E., to Litton Business Systems, Inc. Ribbon cassettes with prethreaded vibrator and ribbon feed means. 3,904,017, Cl. 197-151.000.

Free, David, to Naturvard Research (Canada) Ltd. Automatic tube cleaner for ultraviolet fluid (water) sterilizer. 3,904,363, Cl. 21-102.00R.

Freeland, Harold L.; and Flanagan, James C., to Koch Supplies Inc. Apparatus for smoke and heat processing of food products. 3,903,788, Cl. 99-475.000.

Freeman, Gerald C.: *See*—
Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 3,904,946.

French, Albert Graham: *See*—
Gandy, John Albert; and French, Albert Graham, 3,904,246.
French, Tom; and Martin, Erwin Herbert Erhard, to Dunlop Limited. Pneumatic tire and wheel assemblies. 3,903,946, Cl. 152-330.00L.
Freville, Christian: *See*—
Le Grand, Robert; Freville, Christian; and Colas, Francois, 3,903,822.
Frey, Richard L.: *See*—
Kendy, Leonard; and Frey, Richard L., 3,904,163.
Frick, Heinrich; and Furbringer, Claude, to Hoffmann-La Roche Inc. Process for the preparation of methyl butenol. 3,904,699, Cl. 260-640.000.
Fridman, Evl Gershkovich: *See*—
Afanasiev, Alexandr Dmitrievich; Lykov, Alexei Gavrilovich; Mogilevsky, Alexandr Moiseevich; Sokolov, Leonid Pavlovich; Fridman, Evl Gershkovich; and Dergachev, Fedor Matveevich, 3,904,729.
Fried, John H.; and Harrison, Ian T., to Syntex Corporation. 2-(6'-Methoxy-2'-naphthyl)acetic acid. 3,904,682, Cl. 260-520.000.
Fried, John H.: *See*—
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,904,647.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See*—
Brandis, Curt, 3,903,569.
Friedel, Murray, to Visual Graphics Corporation. Adjustable spacing embosser. 3,904,012, Cl. 197-6.700.
Friedman, Herbert E.: *See*—
Carrick, Warner W.; and Friedman, Herbert E., 3,904,944.
Frieser, Rudolf G.; Powell, Jimmie L.; and Tummala, Rao R., to International Business Machines Corporation. Process for manufacturing low temperature sealing glasses. 3,904,426, Cl. 106-53.000.
Fritsch, Rudolf Paul. Process for the continuous production of vulcanizable mixtures. 3,904,719, Cl. 264-40.000.
Fritsch, Werner: *See*—
Stache, Ulrich; Fritsch, Werner; Haede, Werner; Radscheit, Kurt; and Lindner, Ernst, 3,904,599.
Fritz, Rene; and Fritz, Rene Eugene, to Albany International Industries, Inc. Apparatus for edging and resawing lumber. 3,903,771, Cl. 83-102.100.
Fritz, Rene Eugene: *See*—
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Froehlich, Robert J.: *See*—
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Frohberger, Paul-Ernst: *See*—
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Frydrych, Jiri: *See*—
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Fuchs, Heinz, to B. Braun Melsungen Aktiengesellschaft. Device for introducing flexible catheters. 3,903,885, Cl. 128-214.400.
Fuhrmann, Robert; and Pisanchyn, John, to Allied Chemical Corporation. Method of preparing an α-amino-ω-lactam. 3,904,610, Cl. 260-239.30R.
Fuji Photo Film Co., Ltd.: *See*—
Katada, Takeshi; Kitamoto, Tatsuji; and Akashi, Goro, 3,904,538.
Katsuyama, Harumi; and Ono, Hisatake, 3,904,419.
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Fujii, Tuneo: *See*—
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Fujikura Cable Works, Limited, The: *See*—
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Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.
Fujitsu Fanuc Limited: *See*—
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Fujiwara, Yoshiaki: *See*—
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Fukaya, Hirokazu; and Higashiyama, Naotoshi, to Nippon Electric Company Limited. Power amplifier with a bootstrapped driver stage. 3,904,974, Cl. 330-26.000.
Fuki, Ichiro; Shimizu, Shosaku; Yamamoto, Etsuji; and Yoshida, Masahiko, to Mitsui Shipbuilding and Engineering Co., Ltd.; and Mitsui Petrochemical Industries Ltd. Heat exchanger. 3,903,963, Cl. 165-142.000.
Fukuda, Sadau: *See*—
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Fukuki, Takayuki; Matsuura, Tamio; and Takaoka, Noriyuki, to Mitsui Petrochemical Industries, Ltd. Method for bonding rubber to plastics. 3,904,470, Cl. 156-306.000.
Fukunaka, Shiro: *See*—
Uchida, Kuniki; Araki, Kenzi; Narita, Hirosi; Fukunaka, Shiro; and Kurihara, Takao, 3,904,446.
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Fukushima, Iwao: *See*—
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Furprocess Licensing Co. Inc.: *See*—
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Furuhata, Takashi: *See*—
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Furusawa, Takamasa: *See*—
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Furuta, Motonobu: *See*—
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Fushimi, Shingi; Kishida, Katsuhiro; and Aoki, Hiroyuki, to Nissan Motor Co., Ltd. Gas turbine engine heat regenerator. 3,903,959, Cl. 165-9.000.
Futamase, Tsuyoshi: *See*—
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Gabliya, Jury Alexandrovich; Levin, Lev Emmanuilovich; Bukharin, Evgeny Mikhailovich; Sloevsky, Fedor Ignatievich; Rubinshtein, Abram Borisovich; Avanesian, Vladimir Ambartsumovich; and Birzeniek, Indulis Krishevich. Method of securing structural support elements in soil. 3,903,662, Cl. 52-742.000.
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Gage, Portia L. Molecule model construction kit. 3,903,616, Cl. 35-18.00A.
Gakhar, Ved P.; and Dendinger, Lawrence P., to General Electric Company. Liquid flow diversion arrangement. 3,903,927, Cl. 137-836.000.
Galiano, Francis R.: *See*—
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Gandi, Robert A.: *See*—
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Garrison, Willie; and Van Meter, Michael D. Brick mason's inside corner line-supporting device. 3,903,608, Cl. 33-85.000.
Gartland, Albert John, Jr.; Goodsell, John Phillip; and Hoffman, Ernest Gerhard, to Harvey Hubbell, Incorporated. Circuit tester including information display means for testing electrical outlet receptacles. 3,904,958, Cl. 324-51.000.
Garvey Corporation: *See*—
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Garvey, Francis J., to Garvey Corporation. Spiral conveyor. 3,904,025, Cl. 198-136.000.
Gates Rubber Company, The: *See*—
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Gattuso, Marion J.: *See*—
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Gauch, George J., to Uniroyal, Inc. Floating boom. 3,903,701, Cl. 61-1.00F.

Gaudette, Roger R.; Philbrook, James E.; and Thunberg, Jon C., to W. R. Grace & Co. Process for preparing iminodiacetonitrile and alkali metal iminodiacetates. 3,904,668, Cl. 260-465.50A.
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Gauer, Leonhard, to Gauer AG Electronic. Pressure actuated electrical switch with centrally insulated contact portion. 3,904,842, Cl. 200-81.00R.
Geagan, Edward R. Water distributor for downspouts. 3,904,121, Cl. 239-208.000.
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Gebhardt, Karl: *See—*
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Gebhart, Charles J.; and Gleim, Clyde E., to Goodyear Tire & Rubber Company, The. Flame retardant polyester compositions. 3,904,707, Cl. 260-873.000.
Gebr. Hofmann KG: *See—*
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Gebruder Netzsch, Maschinenfabrik: *See—*
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Gee, Sherman. Optical method for surface texture measurement. 3,904,293, Cl. 356-118.000.
Geirhos, Werner; and Eggermont, Frans, to Fa Grosse Webereimaschinen GmbH. Read-in system for the control of card-punching machine, jacquard machines and the like. 3,904,855, Cl. 235-61.60K.
Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., to General Cable Corporation. Hydraulic system with bi-rotational pump with filter title. 3,903,698, Cl. 60-453.000.
Gemelli, Joseph C. Marking apparatus. 3,903,840, Cl. 118-10.000.
General American Transportation Corporation: *See—*
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Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., 3,903,698.
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George, Jimmie; and Tyson, Charles P. Adjustable trailer hitch. 3,904,225, Cl. 280-478.00R.
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Giese, Elroy J., deceased (by Giese, Alice, executrix), to Tomlinson Industries, Inc. Web tip seat cup. 3,904,174, Cl. 251-331.000.
Gilbert, Robert O. Stabilizing means for a battery grid pasting belt. 3,904,040, Cl. 206-493.000.
Gilles, John R.; McFarland, William F.; and Spears, Jess W. Document distribution system. 3,904,027, Cl. 198-180.000.
Gillet, Lucien A. Clean sole attachment for shoes. 3,903,620, Cl. 36-25.00R.
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Glickman, Leonard. Sunshine hydro electricity. 3,903,700, Cl. 60-641.000.
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Goebel, Eickhart, to Gebr. Hofmann KG. Apparatus for measuring static imbalance of a motor vehicle wheel. 3,903,746, Cl. 73-457.000.
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Goglio, Lugiti. Method and machine for filled bag production. 3,903,672, Cl. 53-24.000.
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Gold, Edward Maurice. Word game. 3,904,207, Cl. 273-135.00R.
Gold, Nathan; and Plummer, William T., to Polaroid Corporation. Automatic lens testing apparatus. 3,904,294, Cl. 356-124.000.
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Goronkin, Herbert, to General Electric Company. Field effect transistor devices and methods of making same. 3,905,036, Cl. 357-22.000.

Gosden, Derek Vernon; Marshall, Anthony Roland; and Robson, David George, to Woodall-Duckham Limited. Decontamination of gas purification process effluent. 3,904,734, Cl. 423-236.000.

Gosselin, Dennis W.: *See—*
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Goyeau, Jean-Pierre, to Agence Nationale de Valorisation de la Recscherche (ANVAR). Perpetual fountain. 3,903,628, Cl. 40-106.210.

Graboski, Michael S.; and Donath, Ernest E., to United States of America, Interior. Combined shift and methanation reaction process for the gasification of carbonaceous materials. 3,904,386, Cl. 48-197.00R.

Grace Machinery Company, Inc.: *See—*
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Graham, Everett Steadman; and Pole, Ernest George, to Polysar Limited. Preparation of latex foam rubbers and films. 3,904,558, Cl. 260-2.50L.

Grahame, Robert Edward, Jr.: *See—*
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Grambo, Lawrence C., Jr.; and Coppola, Daniel J., to General Gummed Products. Device for breaking away individual rolls from a roll of web or sheet material after the roll has been slit. 3,904,097, Cl. 225-103.000.

Grange, Yves, to Les Cables de Lyon. Method for heat treatment for protected electric elements having a mineral insulator in a rust-proof covering. 3,904,444, Cl. 148-11.50R.

Grant, Charles P., Jr.: *See—*
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Grant, Wesley Norman: *See—*
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Grasenick, Fritz. Method for the quantitative elementary analysis of preferably organic substances. 3,904,366, Cl. 23-230.0PC.

Grasvoll, Halvor, to Aktiebolaget Platmanufaktur. Machine for producing a load of goods comprising a plurality of layers. 3,903,673, Cl. 53-162.000.

Grataloup, Xavier Roger, to Societe Anonyme: Nodet Gougis. Working area marking mechanism for agricultural machines. 3,903,970, Cl. 172-126.000.

Gray, Stephen B., to Information International, Inc. Binary image processor. 3,905,018, Cl. 340-146.3MA.

Green, Kenneth A.: *See—*
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Green, William Lawrence, to W. L. Green & Co., Inc. Wind vane self-steering apparatus. 3,903,828, Cl. 114-144.00C.

Greene, Leonard M., to Safe Flight Instrument Corporation. Water speed indicating instrument. 3,903,741, Cl. 73-181.000.

Greene, Robin N., to du Pont de Nemours, E. I., and Company. Random ethylene/alkyl acrylate 1,4-butene-dioic acid terpolymers. 3,904,588, Cl. 260-78.50R.

Greenfield, George L., to Milchem Incorporated. Process of inhibiting scale using an acrylic composition. 3,904,522, Cl. 210-58.000.

Greenia, Maurice J. Aquarium equipment. 3,903,844, Cl. 119-5.000.

Grefco, Inc.: *See—*
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Griese, Alfons, to Institut Dr. Friedrich Forster, Prufgeratebau. Eddy current test apparatus with peak signal value storage means. 3,904,957, Cl. 324-40.000.

Griffin, Roger Thomas; and Hillman, Daniel Lee, to RCA Corporation. Circuits exhibiting hysteresis using transistors of complementary conductivity type. 3,904,888, Cl. 307-205.000.

Griffith, James H.: *See—*
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Griffith Laboratories, Inc., The: *See—*
Sair, Louis; and Quass, Donald W., 3,904,769.

Griffith, Ronald A. Safety lighting system. 3,904,920, Cl. 315-78.000.

Grime, Geoffrey, to Accles-Britax Limited. Safety apparatus for use in a vehicle to restrain the movement of an occupant. 3,903,985, Cl. 180-82.00C.

Groff, Gaylord L., to Minnesota Mining and Manufacturing Company. Adhesive for metal-clad sheeting. 3,904,813, Cl. 174-68.500.

Grossman, Jack J. Pseudo four dimensional dice and game. 3,904,208, Cl. 273-146.000.

Grube, Werner: *See—*
Maier, Gerhard; Grube, Werner; and Schrage, Johannes, 3,904,139.

Gruna, Leo. Emergency sign for automotive vehicles. 3,903,629, Cl. 40-129.00C.

Grunert, Hellmuth, to Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co. Hinge assembly for butt-closing door leaves. 3,903,566, Cl. 16-137.000.

Grupe, Edward H.; and Hechtman, John F., to Kimberly-Clark Corporation. Foam packing sheet for flexographic rubber printing plates. 3,903,794, Cl. 101-376.000.

Grussen, Jean, to Somepla S.A. Tamper-proof and loss-proof screw-type bottle cap. 3,904,062, Cl. 215-252.000.

GTE Automatic Electric Laboratories Incorporated: *See—*
Boucek, Richard A.; and Young, John S., 3,905,024.
Daebler, Donald H.; and Malmgren, Richard P., 3,904,100.

GTE Laboratories Incorporated: *See—*
Peters, Thomas E., 3,903,841.

GTE Sylvania Incorporated: *See—*
Bouchard, Andre C.; and Sentementes, Thomas J., 3,904,348.
Moreno, Frederick E.; Kirk, Russell F.; and Foster, Jack D., 3,904,983.
Szevernyi, Nikolaus A.; and Bickmire, Walter W., 3,905,004.
Warner, Leadom A.; and Cleveland, Joseph J., 3,904,473.

Guerriero, Charles P., to Ford Motor Company. Vehicle suspension bumper. 3,904,219, Cl. 280-124.00R.

Guillemin, Roger C. L.; Brazeau, Paul E., Jr.; Burgus, Roger C.; Ling, Nicholas C.; Rivier, Jean E. F.; and Vale, Wylie W., Jr., to Salk Institute for Biological Studies, The. Somatostatin and acylated des-(ala^1, gly^2) derivatives thereof. 3,904,594, Cl. 260-112.500.

Gulf Research & Development Company: *See—*
Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., 3,904,728.

Gulla, Michael; and Conlan, William A., Jr., to Shipley Company, Inc. Catalyst solution for electroless metal deposition on a substrate. 3,904,792, Cl. 427-304.000.

Guntersdorfer, Max, to Siemens Aktiengesellschaft. Piezoelectric oscillator system. 3,904,896, Cl. 310-8.100.

Gunther Papenmeier KG Maschinen- un Apparatebau: *See—*
Bremer, Horst, 3,903,957.

Gustafson, Karl Ake Sture; and Westbert, Johan Eric Hayden, to Separex SA. Electric heater for heating a fluid medium. 3,904,851, Cl. 219-374.000.

Guth, Lauren W., to General Electric Company. Dishwasher spray system. 3,903,911, Cl. 134-148.000.

Guthrie, Bernard M., to Evans Products Company. Alkali resistant glass. 3,904,423, Cl. 106-50.000.

Guthrie, James Leverette; and Huffman, Lenore J., to W. R. Grace & Co. Method for production of a multicolored urethane sponge. 3,904,557, Cl. 260-2.5BD.

Gzemski, Felex C., to Atlantic Richfield Company. Insulating and protective structure for frozen substrates. 3,903,706, Cl. 61-50.000.

H & B Enterprises, Inc.: *See—*
Boese, Harold L., 3,903,635.

H. B. Zachry Company: *See—*
Schnitzer, Emanuel, 3,904,122.

H. H. Robertson Company: *See—*
Fork, Frank W., 3,903,666.

Haase, Donald A.; and Reed, Robert E., to Mobil Oil Corporation. Process and apparatus for the manufacture of embossed film laminations. 3,904,465, Cl. 156-199.000.

Habermeier, Juerger: *See—*
Batzer, Hans; Habermeier, Juerger; and Porret, Daniel, 3,904,658.

Haede, Werner: *See—*
Stache, Ulrich; Fritsch, Werner; Haede, Werner; Radscheit, Kurt; and Lindner, Ernst, 3,904,599.

Haerr, Raymond H., to Xomox Corporation. Pick-guard. 3,904,033, Cl. 206-349.000.
Haferl, Peter Eduard, to RCA Corporation. Combined amplifiers which consume substantially constant current. 3,904,973, Cl. 330-22.000.
Hafner, Henry F. Lubricating apparatus for conveyor chains with lubricating signaling means. 3,903,994, Cl. 184-15.00A.
Hagelbarger, David William, to Bell Telephone Laboratories, Incorporated. Snap-action pushbutton switch. 3,904,887, Cl. 307-139.000.
Hagemann, Julius, to United States of America, Navy. Sequential sampling telemetric apparatus. 3,905,008, Cl. 340-4.00R.
Hagen, Magnus F.; and Jordan, Fred A. Means for positioning ball retainer for telescoping ball bearing slide mechanisms in relationship to open or closed position of same. 3,904,254, Cl. 308-3.800.
Hahn, Inc.: *See—*
Sorenson, Charles E.; Reynolds, James E.; and DeBaillie, Arnold A., 3,903,679.
Haight, Jimmy R., to Raymond Lee Organization, Inc., The, a part interest. Hand wrench. 3,903,763, Cl. 81-111.000.
Hale, Michael John; and Hawkins, Arthur Ernest, to Lever Brothers Company. Process of treating meat. 3,904,770, Cl. 426-645.000.
Hall-Jackson, John Allan: *See—*
Demaine, David George Anthony; and Hall-Jackson, John Allan, 3,904,873.
Haller, Albert H.: *See—*
Durr, Helmut E.; and Haller, Albert H., 3,903,940.
Haller, Pierre: *See—*
Klar, Erich; Haller, Pierre; and Runge, Ernst Georg, 3,904,881.
Haltrich, Manfred: *See—*
Amtmann, Heribert; and Haltrich, Manfred, 3,904,874.
Hamburger, Brigitte: *See—*
Daum, Werner; Frohberger, Paul-Ernst; and Hamburger, Brigitte, 3,904,643.
Hamel, Harvey C., to International Business Machines Corporation. Superconductive logic circuit utilizing Josephson tunnelling devices. 3,904,889, Cl. 307-212.000.
Hamma, Karlmann, to Zahnradfabrik Friedrichshafen Aktiengesellschaft. Hydromechanical transmission. 3,903,756, Cl. 74-687.000.
Hammann, Ingeborg: *See—*
Buchel, Karl Heinz; and Hammann, Ingeborg, 3,904,762.
Hammar, Walton James; and Conway, Alvin C., to Riker Laboratories, Inc. 8-N-Methylpiperazinyl-N'-carbonyldibenzo-bicyclooctadiene and salts thereof. 3,904,630, Cl. 260-268.0PC.
Hammond, Peter R.: *See—*
McEwan, William S.; and Hammond, Peter R., 3,904,868.
Hamrick, Oliver Henry, Jr.; Zibilich, Joseph L.; and Cwirzen, Casimir, to Cook Electric Company. Rotating terminal block assembly. 3,904,936, Cl. 317-118.000.
Hamy, Norbert, to Trebron Holdings Limited. Transport system. 3,903,825, Cl. 114-77.00R.
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo, to Canon Kabushiki Kaisha. Electrophotographic member with graded tellurium content. 3,904,408, Cl. 96-1.500.
Hanada, Hiroshi; and Takahashi, Toru, to Canon Kabushiki Kaisha. Photoconductive body for electrophotography and the method of manufacturing the same. 3,904,409, Cl. 96-1.500.
Hancock, Kenneth R.: *See—*
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 3,904,540.
Hanela, Harley E. Spare tire carrier. 3,904,093, Cl. 224-42.210.
Hanfmann, Alexander Maxim, to Western Electric Company, Incorporated. Depositing material on a substrate using a shield. 3,904,503, Cl. 204-192.000.
Hansen, Ralph Holm, to Bell Telephone Laboratories, Incorporated. Antioxidants for polyolefins. 3,904,582, Cl. 260-45.80N.
Hanton, Alois, to Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstri. Dial needle bed for circular knitting machine. 3,903,713, Cl. 66-19.000.
Harada, Ikuo: *See—*
Shiki, Takehiko; Harada, Tadamasa; Harada, Ikuo; and Shiga, Masaaki, 3,904,221.
Harada, Tadamasa: *See—*
Shiki, Takehiko; Harada, Tadamasa; Harada, Ikuo; and Shiga, Masaaki, 3,904,221.
Hargroves, Robert Arthur: *See—*
Jones, Kenneth James; and Hargroves, Robert Arthur, 3,904,864.
Harke, Cyril J.; and Eng, Jeffrey D., to Hooker Chemicals & Plastics Corporation. Electrolytic production of chlorine dioxide, chlorine, alkali metal hydroxide and hydrogen. 3,904,496, Cl. 204-98.000.
Harke, Cyril J.: *See—*
Eng, Jeffrey D.; and Harke, Cyril J., 3,904,495.
Harlan, James T., Jr., to Shell Oil Company. Hydroxylated and chlorinated block copolymer laminates. 3,904,801, Cl. 428-246.000.
Harmjanz, Dietrich. Catheter for the electrical stimulation of the heart. 3,903,896, Cl. 128-418.000.
Harper, Gerald Bruce. Indicators covalently bound to insoluble carriers. 3,904,373, Cl. 23-253.0TP.
Harris, Frederick James: *See—*
Naylor, Denis; and Harris, Frederick James, 3,904,438.
Harris-Intertype Corporation: *See—*
Maier, Robert E., Jr.; and McGinnis, Joseph P., 3,904,191.
Harris, Thomas R., to Leland Stanford Junior University, The Board of Trustees of. Respiration monitor. 3,903,876, Cl. 128-2.080.
Harrison, David Carl. Heat energy transmission control panel. 3,903,665, Cl. 52-171.000.
Harrison, Ian T.: *See—*
Fried, John H.; and Harrison, Ian T., 3,904,682.
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,904,647.
Harsy-Vadas, Gabor, to S I G Schwiezerische Industrie-Gesellschaft. Fluid type accumulator spring with emergency back-up spring. 3,904,181, Cl. 267-35.000.
Hartel, Kurt: *See—*
Rochling, Hans; Hartel, Kurt; and Goebel, Helmut, 3,904,621.
Harter Corporation: *See—*
Koepke, Earl H.; and Reichard, Alan R., 3,904,242.
Hartley, Joseph H.: *See—*
Bates, Calvin D.; and Hartley, Joseph H., 3,904,994.
Harvey Hubbell, Incorporated: *See—*
Gartland, Albert John, Jr.; Goodsell, John Phillip; and Hoffman, Ernest Gerhard, 3,904,958.
Harvey, James E., III: *See—*
Waldron, John W.; and Harvey, James E., III, 3,904,930.
Harwood, Charles C.; and Smith, George M., Jr., to Quaker Oats Company, The. Process for production of a simulated meat product. 3,904,775, Cl. 426-641.000.
Hase, Kohichi, to Trio Electronics Incorporated. Operating device for magnetic recording and reproducing apparatus. 3,905,041, Cl. 360-62.000.
Hasegawa, Minoru: *See—*
Kanaya, Yoshinosuke; Hasegawa, Minoru; Azuma, Kanae; Ochiai, Minoru; and Shimizu, Jun, 3,904,929.
Hasegawa, Takanori; and Tsuji, Yoshio, to Asahi-Dow Limited; and Riso Kagaku Corporation. Imaged sheet or film and method and apparatus for preparing same. 3,904,877, Cl. 250-317.000.
Haselhoff, Freidhelm: *See—*
Bertling, Alfred; and Haselhoff, Freidhelm, 3,904,056.
Haselmann, Heinrich: *See—*
Wilfert, Karl; Barenyi, Bela; Haselmann, Heinrich; Scholz, Hansjurgen; Backhaus, Hans-Gerd; and Brambilla, Luigi, 3,904,223.
Hasenwinkle, Earl Dean, to Weyerhaeuser Company. Log cutting and rejoining process. 3,903,943, Cl. 144-315.00R.
Hashimoto, Masanao, to Toyota Jidosha Kogyo Kabushiki Kaisha. Control system for automatic transmissions. 3,903,759, Cl. 74-866.000.
Hashimoto, Masashi: *See—*
Kamiya, Takashi; Teraji, Tsutomu; and Hashimoto, Masashi, 3,904,607.
Haspert, John C. Method and apparatus for mechanized seam mining. 3,904,244, Cl. 299-34.000.
Hassan, Javathu K.; and Rabstejnek, Carl V., to International Business Machines Corporation. Precision tool and workpiece positioning apparatus. 3,904,945, Cl. 318-593.000.
Hattori, Osamu: *See—*
Sugimoto, Toshitaka; Takami, Norihiko; and Hattori, Osamu, 3,904,837.
Hau, Antonin; Frydrych, Jiri; and Srubar, Jiri, to Ustav pro vyzkum motorovych vozidel. Hydraulic differential gear box. 3,903,757, Cl. 74-688.000.
Hauni-Werke Korber & Co., KG: *See—*
Wochnowski, Waldemar, 3,903,901.
Hauser, Ivo, to Societe d'Assistance Technique pour Produits Nestle S.A. Container and closure. 3,904,063, Cl. 215-318.000.
Hawkins, Arthur Ernest: *See—*
Hale, Michael John; and Hawkins, Arthur Ernest, 3,904,770.
Hawthorne, Peter Frederick, to Foseco International Limited. Protection of turbine casings. 3,904,427, Cl. 106-55.000.
Hay, Harold R. Process and apparatus for modulating temperatures within enclosures. 3,903,958, Cl. 165-2.000.
Hayashi, Kunihisa; and Tadera, Yoshihiro, to Toyo Kogyo Co., Ltd. Grinding machine in which the force applied to a guide template is advantageously reduced. 3,903,654, Cl. 51-101.00R.
Hayashi, Yasutaka: *See—*
Hikida, Ryotaro; Hayashi, Yasutaka; Arakawa, Hideo; and Mori, Takahiko, 3,904,251.
Hayashi, Yoshiaki: *See—*
Sato, Kohei; and Hayashi, Yoshiaki, 3,905,001.
Hayes, Dorothy E. Translucent structural panels. 3,904,866, Cl. 240-10.00L.
Hazeltine Corporation: *See—*
La Rosa, Richard, 3,904,990.
Heath, Thomas D.: *See—*
Barton, William W.; and Heath, Thomas D., 3,904,549.
Heaviside, John B.; and Smith, Franklin W., Jr., to North Atlantic Industries, Inc. Apparatus for measuring magnetic field direction. 3,903,610, Cl. 33-361.000.
Hecht, Victor, to Stearns, C. Wayne. Crankcase fumes treatment. 3,903,858, Cl. 123-119.00B.
Hechtman, John F.: *See—*
Grupe, Edward H.; and Hechtman, John F., 3,903,794.
Heckl, Herwig, to Siemens Aktiengesellschaft. Process for the production of a thin layer mesa type semiconductor device. 3,903,592, Cl. 29-578.000.
Heiba, El-Ahmadi Ibrahim; and Bridger, Robert Frederick, to Mobil Oil Corporation. Process for eliminating unstable hydrogen from lubricating oil stock. 3,904,511, Cl. 208-177.000.
Heidelberger Druckmaschinen Aktiengesellschaft: *See—*
Jeschke, Willie; and Zander, Claus-Peter, 3,903,796.
Heil Co., The: *See—*
Prahst, Eugene D., 3,904,049.
Heil-Quaker Corporation: *See—*
Anderson, Richard M.; and Sykes, James M., 3,903,709.

Heimsch, Robert A.: *See*—
Erickson, Floyd B.; Heimsch, Robert A.; and Reaville, Eric T., 3,904,411.
Heitmann, Knut: *See*—
Hock, Fromund; Heitmann, Knut; and Kaul, Dietmar, 3,904,295.
Hekal, Ihab M.; and Chelton, Raymond G., to Continental Can Company, Inc. Metal coating compositions prepared from aqueous dispersions of carboxylic acid resin and an aliphatic polyamine. 3,904,569, Cl. 260-29.60N.
Hell, Peter-Matthias: *See*—
Scheuermann, Horst; Hell, Peter-Matthias; and Burkhardt, Gottfried, 3,904,678.
Hemrich, William R.; and Gallanis, George P., to Sunbeam Corporation. Heated comb with mist feature. 3,903,904, Cl. 132-9.000.
Hendrickx, Andreas J. J.; and de Haij, Nicolaas A., to Andeno N.V. Preparation of phloroglucinol and its mono-ethers. 3,904,695, Cl. 260-613.00D.
Hengelhaupt, Hans-Georg, to Triumph Werke Nurnberg A.G. Typewriter ribbon arrangement having interchangeable ribbon loadable cartridges with attached movable ribbon lifters. 3,904,016, Cl. 197-151.000.
Henrick, Clive A.; and Siddall, John B., to Zoecon Corporation. 2,4-Dienoic acids, esters and derivatives. 3,904,662, Cl. 260-410.000.
Henry, Dana R. Tennis ball. 3,904,201, Cl. 273-61.00R.
Henry, Donald E. Method of preparing cells for inspection. 3,904,781, Cl. 427-2.000.
Henry, Edward F. Automatic telephone answering device with mechanical drive control of index timing. 3,904,825, Cl. 179-6.0AC.
Henry Mann, Inc.: *See*—
Vizy, Adam J., 3,903,934.
Henzi, Rene: *See*—
Losi, Salvatore; Lalanne, Pierre; Henzi, Rene; and Marka, Erwin, 3,904,493.
Herbert, Colin Wray, to Glacier Metal Company Limited, The. Plain bearings. 3,904,257, Cl. 308-237.00R.
Herbert Kannegiesser Kommanditgesellschaft, Firma: *See*—
Kannegiesser, Martin; and Knappe, Heinrich, 3,904,090.
Hercules Incorporated: *See*—
Cessna, Lawrence C., Jr., 3,904,574.
Herman, Marvin: *See*—
Clingman, David L.; Schechter, Berton; Herman, Marvin; and Sippel, George R., 3,904,316.
Hermanns, Peter, to FMN Schuster & Co. Apparatus for changing the end structural configuration of thread packages. 3,904,140, Cl. 242-43.100.
Hermsen, Robert William; and Willoughby, Paul G., to United States of America, Navy. Rocket noise generator. 3,903,988, Cl. 181-142.000.
Hernqvist, Karl Gerhard, to RCA Corporation. Gas laser tube. 3,904,986, Cl. 331-94.50G.
Hertrich, Klaus; and Fenske, Horst, to Veb Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Folding of sheet-material blanks. 3,904,187, Cl. 270-83.000.
Herzog, Rupert C. Kinetic card viewing device. 3,903,627, Cl. 40-65.000.
Heseltine, Donald W.: *See*—
Lincoln, Lewis L.; and Heseltine, Donald W., 3,904,637.
Hesener, Walter. Apparatus for playing an educational game including moveable setting means. 3,903,619, Cl. 35-48.00R.
Hess, Heinrich J.; and Pagnotta, Gasper, to General Electric Company. Method of sealing an aperture in a metallic surface and battery employing an aperture seal. 3,904,440, Cl. 136-175.000.
Hess, Irving J.: *See*—
Russell, Robert A.; and Hess, Irving J., 3,904,405.
Hesse, Karl-Dieter; and Koch, Karl-Ernst, to Chemische Werke Huls Aktiengesellschaft. Process for the removal of catalyst residues. 3,904,498, Cl. 204-157.10S.
Hetmann, Richard, to Dr. -Ing. H.c.F. Porsche K.G., Firma. Elastic joint and method of assembly for interconnecting steering linkages, especially of motor vehicles. 3,904,300, Cl. 403-203.000.
Hexcel Corporation: *See*—
Charlton, John R., 3,904,541.
Heyne, Clarence A.: *See*—
Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., 3,903,768.
Hicks, Littleberry T. Leaf and grass cart bagger. 3,903,565, Cl. 15-352.000.
Hieronymus, Hans: *See*—
Miericke, Jurgen; Hieronymus, Hans; and Pawlitschek, Franz, 3,903,809.
Higashiyama, Naotoshi: *See*—
Fukaya, Hirokazu; and Higashiyama, Naotoshi, 3,904,974.
Higbee, David A.; and Jasper, Joseph C., to Armco Steel Corporation. Steel clad stainless composite article. 3,904,378, Cl. 29-183.500.
Higgins, Harvey M., Jr.; and Fitzsimmons, Jon W., to Eli Lilly and Company. Process for cleaving cephalosporin compounds. 3,904,615, Cl. 260-243.00C.
Highway Equipment Company: *See*—
Lorenc, Allan L., 3,904,129.
Higo, Yoshiki, to Nippon Electric Company Limited. Digital circuit. 3,904,895, Cl. 307-288.000.
Higuchi, Takeru; and Hussain, Anwar, to Alza Corporation. Intrauterine device for managing the reproductive process. 3,903,880, Cl. 128-130.000.
Hikida, Ryotaro; Hayashi, Yasutaka; Arakawa, Hideo; and Mori, Takahiko, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Automatic skid reduction control method and device for a braking system. 3,904,251, Cl. 303-21.0BE.
Hildenbrand, Jerry L., to Westinghouse Electric Corporation. Electrical bushing having a two-chambered fluid expansion system. 3,904,807, Cl. 174-12.0BH.
Hill, John W.; and Sword, Antony J., to Stanford Research Institute. Manipulator with electromechanical transducer means. 3,904,234, Cl. 294-106.000.
Hill, Robert R.; and Beemer, Robert J., to Lee Wilson Engineering Company, Inc. Open coil heat shielding. 3,904,356, Cl. 432-249.000.
Hill, Robert W.: *See*—
Davis, Joseph C.; Galiano, Francis R.; and Hill, Robert W., 3,904,728.
Hill, T. Gardner, to Lockheed Aircraft Corporation. Variable area, variable camber wing for aircraft. 3,904,152, Cl. 244-43.000.
Hillman, Daniel Lee: *See*—
Griffin, Roger Thomas; and Hillman, Daniel Lee, 3,904,888.
Hilsum, Cyril; and Mears, Adrian Leonard, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Electroluminescent display panel with switching voltage pulse means including photosensitive latches. 3,904,924, Cl. 315-169.0TV.
Hilti Aktiengesellschaft: *See*—
Maier, Elmar, 3,904,032.
Hindel, Robert: *See*—
Martone, Ronald J.; Mueller, Peter G.; and Hindel, Robert, 3,904,530.
Hinds, Horace, Jr., to Grace Machinery Company, Inc. Washing and cooling cottage cheese curd. 3,904,779, Cl. 426-431.000.
Hinson, David C., to Owens-Illinois, Inc. Gas mixture for gas discharge device. 3,904,915, Cl. 313-484.000.
Hirakawa, Michio: *See*—
Yamaguchi, Tadashi; Hoshi, Hiroshi; Hirakawa, Michio; and Watanabe, Isao, 3,904,568.
Hirano, Ikuro, to Kabushiki Kaisha Meidensha. Coil arrangement of an electrical equipment wherein a compensating impedance provides uniform distribution of internal impedance and current. 3,904,953, Cl. 323-44.00R.
Hirosawa, Yoshiaki; and Takahashi, Tsuneo, to Honda Giken Kogyo Kabushiki Kaisha. Gas detecting device. 3,903,726, Cl. 73-23.000.
Hisada, Souichi; and Sometani, Taro. Fuel injecting systems for internal combustion engines. 3,903,850, Cl. 123-32.0EA.
Hitachi, Ltd.: *See*—
Imaizumi, Ichiro; and Nagata, Minoru, 3,904,921.
Inose, Fumiyiki; and Iwasaki, Takashiro, 3,905,015.
Kishi, Atsuo; and Degawa, Takashi, 3,904,320.
Matsumoto, Shuzo, 3,904,918.
Moriguti, Kazuo; Yamaguchi, Yukio; and Suzuki, Mutuo, 3,904,311.
Sawada, Hiroji; Mizuhara, Yasuhiro; Isogai, Tokio; and Nagai, Matao, 3,904,928.
Seki, Kunio; and Sakamoto, Yoshio, 3,904,972.
Sugimoto, Toshitaka; Takami, Norihiko; and Hattori, Osamu, 3,904,837.
Tannaka, Yasuaki, 3,903,990.
Yumde, Yasufumi; and Furuhata, Takashi, 3,905,039.
Hock, Fromund; Heitmann, Knut; and Kaul, Dietmar, to Ernst Leitz G.m.b.H. Method and apparatus for the no-contact measurement of velocities, changes in relative position, or displacement paths. 3,904,295, Cl. 356-167.000.
Hodge, Edward B., to Commercial Solvents Corporation. Substituted triazabicyclononanes. 3,904,626, Cl. 260-256.40H.
Hoechst Aktiengesellschaft: *See*—
Brandt, Wilhelm; and Bindrum, Irmgard, 3,904,794.
Plotz, Manfred, 3,903,715.
Rochling, Hans; Hartel, Kurt; and Goebel, Helmut, 3,904,621.
Stache, Ulrich; Fritsch, Werner; Haede, Werner; Radscheit, Kurt; and Lindner, Ernst, 3,904,599.
Hoerner Waldorf Corporation: *See*—
Hurley, Thomas Joseph, 3,903,789.
Hoeschele, Guenther Kurt, to du Pont de Nemours, E. I., and Company. Stabilization of polymers containing poly(alkylene oxide) units. 3,904,706, Cl. 260-858.000.
Hofer, Walter David. Combine tooth assembly. 3,904,026, Cl. 198-172.000.
Hofferbert, William L.: *See*—
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Hoffman, Carl S.: *See*—
Olenzek, Richard T.; Petrak, Herman H.; Hoffman, Carl S.; and Louzecky, Paul J., 3,903,847.
Hoffman, Ernest Gerhard: *See*—
Gartland, Albert John, Jr.; Goodsell, John Phillip; and Hoffman, Ernest Gerhard, 3,904,958.
Hoffman, Harvey F.; and Waehner, Glenn C., to United Aircraft Corporation. Serial scan converter. 3,904,817, Cl. 178-6.800.
Hoffman, Louis S.; and Spruyt, Harry. Moisture responsive tilting planter. 3,903,641, Cl. 47-34.000.
Hoffman, Louis S.; and Spruyt, Harry, to Scott Paper Company. Packaging system. 3,904,074, Cl. 220-339.000.
Hoffman, Mark: *See*—
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 3,904,540.

Hoffmann-La Roche Inc.: *See*—
Frick, Heinrich; and Furbringer, Claude, 3,904,699.
Hollander, Charles William Den; Leimgruber, Willy; and Mohacsi, Ernest, 3,904,632.
Hoffmann, William F.; and Blissell, Walter A., Jr., to Boeing Company, The. Magnetic tape cassette storage containers. 3,904,259, Cl. 312-111.000.
Hogle-Kearns International: *See*—
Brayshaw, Forrest G., 3,903,891.
Holderbank Management & Consulting Ltd.: *See*—
Bosshard, Ulrich Walter; Kupper, Arthur Kurt; and Lohr, Manfred, 3,904,353.
Holl, Edward J. Apparatus for excavating, shoring and backfilling a trench. 3,903,624, Cl. 37-82.000.
Hollander, Charles William Den; Leimgruber, Willy; and Mohacsi, Ernest, to Hoffmann-La Roche Inc. (−)-Di-O-isopropylidene-2-keto-L-gulonates. 3,904,632, Cl. 260-285.000.
Hollins, Jesse R. Motor vehicle air conditioner control system. 3,904,885, Cl. 307-10.00R.
Hollyday, Robert David; and Schofield, Paul Francis, to AMP Incorporated. Electrical connector shield having an internal cable clamp. 3,904,265, Cl. 339-103.00M.
Holma, Gary M.: *See*—
Lebduska, Robert L.; and Holma, Gary M., 3,904,269.
Holmes, Robert W.: *See*—
Dey, Arabinda N.; and Holmes, Robert W., 3,904,432.
Holtz, Joachim, to Siemens Aktiengesellschaft. System for operating a self-propelled track bound vehicle with a linear synchronous motor. 3,904,942, Cl. 318-135.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Hirosawa, Yoshiaki; and Takahashi, Tsuneo, 3,903,726.
Honda, Hidemasa; Isayama, Yukio; Jinnai, Kazuhiko; and Kimura, Kunio, to Agency of Industrial Science & Technology. Lightweight composite containing hollow glass microspheres. 3,904,377, Cl. 29-180.00R.
Honda, Norimasa: *See*—
Satokawa, Takaomi; Fujii, Tuneo; Honda, Norimasa; Asano, Kozo; Nakamura, Yukiharu; and Suzue, Seisuke, 3,904,575.
Hondermarck, Jean Claude: *See*—
du Chaffaut, Jean Amaudric; Hondermarck, Jean Claude; and Laine, Bernard Maurice, 3,904,485.
Honegger, Heinrich, to Honel Holdings AG. Expansion joints for a roadway. 3,904,304, Cl. 404-69.000.
Honel Holdings AG: *See*—
Honegger, Heinrich, 3,904,304.
Honeywell Inc.: *See*—
Benz, Donald E.; Garfunkel, James H.; and Kompelien, Arlon D., 3,904,880.
Rork, Gerald D.; and Simon, Frank N., 3,903,732.
Stauffer, Norman L., 3,904,869.
Stauffer, Norman L., 3,904,870.
Honig, Gunter; and Schulz, Alfred, to Robert Bosch G.m.b.H. Digital trigger system to control timing of a controlled event with respect to operation of an apparatus, particularly digital ignition timing circuit for internal combustion engines. 3,903,857, Cl. 123-117.00R.
Hooker Chemicals & Plastics Corporation: *See*—
Eng, Jeffrey D.; and Harke, Cyril J., 3,904,495.
Furness, Ralph J.; and Less, Frank W., 3,904,559.
Harke, Cyril J.; and Eng, Jeffrey D., 3,904,496.
Ruthel, Walter W.; and Evans, Leo G., 3,904,504.
Hooper, Leonard Cecil: *See*—
Brush, John Burke; and Hooper, Leonard Cecil, 3,903,674.
Hopfenberg, Harold B.; and Rees, Thomas C., to Sherwin-Williams Company, The. Organic pigments encapsulated with vinylpyrrolidone polymer. 3,904,562, Cl. 260-22.0CB.
Hopper, Roger J.: *See*—
Shelton, James R.; and Hopper, Roger J., 3,904,664.
Horeni, Bohumir; Zid, Vladimir; Neckar, Bohuslav; and Prochazka, Jan, to Statni vyzkumny ustav textilni. Quilted fabric and method. 3,903,714, Cl. 66-193.000.
Hori, Jiro, to Sailor Pen Co., Ltd., The. Socket for holding the writing ball of a ball-point pen. 3,904,297, Cl. 401-216.000.
Hori, Makoto: *See*—
Rokudo, Nerumitsu; Ishiguro, Toshiyuki; and Hori, Makoto, 3,904,347.
Horiguchi, Tadao: *See*—
Suzuki, Shigeyuki; Kaneda, Isamu; Endo, Hiroshi; Miyata, Kazuo; Horiguchi, Tadao; and Yamamoto, Kazumasa, 3,904,687.
Horiike, Hideki: *See*—
Morimoto, Masayoshi; Sanjiki, Tetsutaro; Horiike, Hideki; and Furuta, Motonobu, 3,904,709.
Horowitz, Jack K.: *See*—
Matschke, Arthur L.; and Horowitz, Jack K., 3,904,011.
Horwinski, Elwood R., to Products, Inc. Low or zero pollution hybrid energy converter and transmission unit. 3,904,883, Cl. 290-50.000.
Horwitt, Laurence G.; and Mattis, Donald J., to Sun Chemical Corporation. Cigar lighter igniting unit. 3,904,848, Cl. 219-267.000.
Hoshi, Hiroshi: *See*—
Yamaguchi, Tadashi; Hoshi, Hiroshi; Hirakawa, Michio; and Watanabe, Isao, 3,904,568.
Hostetler, Eldon, to Chore-Time Equipment, Inc. Weight controlled feeder system. 3,904,082, Cl. 222-70.000.
Hotten, Bruce W.: *See*—
Gordon, Chester D.; Lowe, Warren; and Hotten, Bruce W., 3,904,535.
Hovnanian, Hrair Philip, to Avco Corporation. Impact fuze. 3,903,805, Cl. 102-70.20R.
Howell, Robert B. Slider stop for seam type zippers. 3,903,571, Cl. 24-205.11R.
Howell, Stephen C. Annular winged model airplane. 3,903,639, Cl. 46-78.000.
Howells, Ronald McKenzie: *See*—
Jury, Harold Rex; and Howells, Ronald McKenzie, 3,903,769.
Howland, Raymond J., Jr., to Safety, Inc. Method of preparing a protective device for safety shoes. 3,903,557, Cl. 12-142.00R.
Howmet Corporation: *See*—
Lirones, Nicholas G., 3,903,950.
Hoy, William M.: *See*—
Speirs, Kenneth K.; Hoy, William M.; and Bradley, Robert, 3,904,789.
Hruby, Frank J. Method of increasing protein content of a waste food product. 3,904,768, Cl. 426-53.000.
Hsiao, Perng, to Motorola, Inc. CMOS voltage controlled oscillator. 3,904,988, Cl. 331-111.000.
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, to Mitsubishi Gas Chemical Company, Inc. Cold-setting coating composition based on hydroxy-containing vinyl polymer. 3,904,572, Cl. 260-31.2MR.
Hubbard, S. Eugene; and Meisterheim, Richard A., to Kawneer Company, Inc. Automatic sliding door. 3,903,647, Cl. 49-27.000.
Hubbard, Winchester Loomis: *See*—
Ariyan, Zaven Stephen; Grahame, Robert Edward, Jr.; and Hubbard, Winchester Loomis, 3,904,760.
Huber, Josef; and Steinmann, Gerd, to Siemens Aktiengesellschaft. Method for diagnosing the condition of data processors. 3,904,860, Cl. 235-153.0AC.
Hudson, Billy C. Investment casting apparatus on framework. 3,903,953, Cl. 164-255.000.
Huffman, Lenore J.: *See*—
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Hugenholtz, Eduard Herman. Displaced spectrum frequency synthesizer. 3,904,980, Cl. 331-4.000.
Hughes Aircraft Company: *See*—
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McCord, Henry L., 3,905,031.
Hughes, Philip A., to Sandoz Inc. Automatically calibrated respiratory ventilation monitor. 3,903,875, Cl. 128-2.080.
Hughes, Richard Swart; and Matulka, Robert D., to United States of America, Navy. Ultrafast spatially scanning laser system. 3,904,981, Cl. 331-94.50K.
Hughes, William J.; Thompson, William, Jr.; and Ingram, Richard D., to United States of America, Navy. Transducer array scanning system. 3,905,009, Cl. 340-6.00R.
Hughey and Phillips: *See*—
Knudson, Clarence B., 3,904,954.
Hull, Robert N.; and Huseby, Rolf M., to Eli Lilly and Company. Enhanced production of plasminogen activator. 3,904,480, Cl. 195-66.00B.
Humbert, Daniel: *See*—
Derible, Pierre Henri; Humbert, Daniel; and Dumont, Claude, 3,904,586.
Hummel, Lothar, to ISCO Optische Werke GmbH. Plastic lens mounting for optical system. 3,904,278, Cl. 350-255.000.
Hunter, C. Shelburn, to Eastman Kodak Company. Information receiving element containing a yellow dye and an optical brightener. 3,904,420, Cl. 96-82.000.
Hurley, Thomas Joseph, to Hoerner Waldorf Corporation. Container for newspaper collection. 3,903,789, Cl. 100-34.000.
Huseby, Rolf M.: *See*—
Hull, Robert N.; and Huseby, Rolf M., 3,904,480.
Husky, C. George; Resler, Charles J., Jr.; and Sanders, Sidney C., to du Pont de Nemours, E. I., and Company. Quenching molten thermoplastic film. 3,904,725, Cl. 264-89.000.
Husmann, Horst, to Volkswagenwerk Aktiengesellschaft. Overrunning clutch. 3,904,005, Cl. 192-45.000.
Huss Equipment Corporation: *See*—
Smith, Frank L., 3,904,024.
Hussain, Anwar: *See*—
Higuchi, Takeru; and Hussain, Anwar, 3,903,880.
Huston, Paul O.; Douma, William L.; and Gandi, Robert A., to Becton, Dickinson and Company. Manifold nebulizer system. 3,903,884, Cl. 128-194.000.
Hutcherson, Robert. Fishing rod holder and signal. 3,903,633, Cl. 43-17.000.
Hutcheson, Edward J.: *See*—
Sargent, Charles L.; and Hutcheson, Edward J., 3,904,217.
Hutchins, Thomas B., IV. Deflection-sensitive electrical transducer with deflection focusing. 3,905,005, Cl. 338-2.000.
Hutton, David Glenn; and Robertaccio, Francis Leonard, to du Pont de Nemours, E. I., and Company. Waste water treatment process. 3,904,518, Cl. 210-11.000.
Hyde, Thomas Gerald: *See*—
Clark, David Ronald; and Hyde, Thomas Gerald, 3,904,544.
Hydro-Vel Services, Inc.: *See*—
Ice, Charles O., Jr.; and Shanklin, Earis Ray, 3,903,912.
Hydroacoustics Inc.: *See*—
Bouyoucos, John V.; and Selsam, Roger L., 3,903,972.

Hyler, John H., to Westinghouse Air Brake Company. Automatic adjustment of scraper elevator using servo system having ground engaging shoe. 3,903,623, Cl. 37-8.000.

Ice, Charles O., Jr.; and Shanklin, Earis Ray, to Hydro-Vel Services, Inc. Tube cleaning system. 3,903,912, Cl. 134-167.00C.

Ichihashi, Kyozi: *See—*
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Ideal Security Hardware Corporation: *See—*
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Iga, Atsushi: *See—*
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Igawa, Masayuki: *See—*
Tabara, Yoshijiro; Akiyama, Hiroshi; Igawa, Masayuki; Maekawa, Tadashi; and Shinomiya, Tokuo, 3,904,804.

Ijuin, Yasuharu: *See—*
Uehara, Hiromichi; Arimitsu, Satoshi; and Ijuin, Yasuharu, 3,904,739.

Ikegami, Masuya: *See—*
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.

Ilford Limited: *See—*
Jones, David Peter Marshall, 3,903,843.

Imaizumi, Ichiro; and Nagata, Minoru, to Hitachi, Ltd. Starting device for discharge lamp. 3,904,921, Cl. 315-101.000.

Imhoff, Harold J.; Bennett, Jack H.; and Turpin, Dennis E., to Imhoff, Harold J. Lapping machine. 3,903,653, Cl. 51-59.00R.

Immer, Hans U.; Nelson, Verner R.; and Gotz, Manfred K., to American Home Products Corporation. Peptide derivatives having an α-hydrazide linkage and preparation thereof. 3,904,593, Cl. 260-112.500.

Imperial Chemical Industries Limited: *See—*
Ashby, Ernest John, 3,904,689.
Punja, Nazim, 3,904,759.
Tipping, James William; and Whim, Bernard Patrick, 3,904,430.
White, Trevor Raymond, 3,904,705.
Wray, Raymond Patrick, 3,904,458.

Inariba, Tokuzo. Synchronous motor. 3,904,902, Cl. 310-162.000.

Inata, Hiroo: *See—*
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Industrial Nucleonics Corporation: *See—*
Straumanis, Maris, 3,904,338.

Industrial Research Company: *See—*
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Inflo Systems, Inc.: *See—*
Rich, Donald S.; and Rudnick, Norman, 3,904,999.

Information International, Inc.: *See—*
Gray, Stephen B., 3,905,018.

Ingram, Richard D.: *See—*
Hughes, William J.; Thompson, William, Jr.; and Ingram, Richard D., 3,905,009.

Inose, Fumiyiki; and Iwasaki, Takashiro, to Hitachi, Ltd. Vehicle collision detecting apparatus. 3,905,015, Cl. 340-61.000.

Inoue, Masahide: *See—*
Aoki, Harumi; Inoue, Masahide; and Kawasaki, Harumi, 3,905,019.

Inoue, Masatoshi: *See—*
Sagawa, Seiji; Kunihiro, Haruo; Kimura, Osamu; and Inoue, Masatoshi, 3,904,638.

Inoue, Shunzo, to Canon Kabushiki Kaisha. Information retrieval system. 3,904,099, Cl. 226-33.000.

Inoue, Shunzo: *See—*
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Institut de Recherches de la Siderurgie Francaise (IRSID): *See—*
Antoine, Jacques; Alberny, Robert; and Michelet, Jacques, 3,903,955.

Institut Dr. Friedrich Forster, Prufgeratebau: *See—*
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Institut Francaise du Petrole, des Carburante et Lubrifiants: *See—*
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Institute for Graphic Communication, Inc.: *See—*
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Instituut Voor Bewaring en Verwerking Van Landbouwprodukten: *See—*
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Instrumentation Specialties Company: *See—*
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International Business Machines Corporation: *See—*
Barsotti, Rudolf H., 3,904,977.
Caragliano, Edward S.; and Nick, Howard H., 3,904,824.
Cloud, Samuel P.; Kalthoff, Clement H.; Rueger, William J.; and Thompson, Timothy W., 3,904,148.
Davis, Michael I.; Loffredo, John M.; Wise, Larry E.; and Rickard, Patrick L., 3,905,025.
Ehling, Theodore P.; Plaza, Alexander; and Ruehli, Albert E., 3,904,886.
Frieser, Rudolf G.; Powell, Jimmie L.; and Tummala, Rao R., 3,904,426.
Gersbach, John Edwin, 3,904,951.
Hamel, Harvey C., 3,904,889.
Hassan, Javathu K.; and Rabstejnek, Carl V., 3,904,945.
Magdo, Ingrid E.; and Magdo, Steven, 3,904,454.
Rich, David W.; Smith, Matthew C.; and Zipay, Michael, 3,904,492.
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International Election Systems Corporation: *See—*
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International Flavors & Fragrances Inc.: *See—*
Pittet, Alan O.; Pascale, John V.; Patton, Stuart; and Brodnitz, Michael H., 3,904,556.
Wolt, John; Giacino, Christopher; Quinn, Alton Dewitt; Shuster, Edward J.; and Vinals, Joaquin F., 3,903,900.

International Harvester Company: *See—*
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International Inpak Inc.: *See—*
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International Minerals & Chemical Corporation: *See—*
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International Paper Company: *See—*
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International Standard Electric Corporation: *See—*
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International Telephone and Telegraph Corporation: *See—*
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Robison, James Ray, 3,904,370.

International Tools: *See—*
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Interpace Corporation: *See—*
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Ioannou, John T.: *See—*
Kamm, Vernon C.; Ioannou, John T.; and Faxon, James L., 3,904,822.

Irgens, Finn T., to Outboard Marine Corporation. Balancing system. 3,903,995, Cl. 184-27.000.

Isaac, Otto, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for the recovery of hellebrin. 3,904,598, Cl. 260-210.500.

Isayama, Yukio: *See—*
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ISCO Optische Werke GmbH: *See—*
Hummel, Lothar, 3,904,278.

Isern, Carlos Pujol. Method and apparatus for splicing yarns and rovings. 3,903,680, Cl. 57-22.000.

Ishida, Choshichi. Water surface gliding vehicle. 3,903,832, Cl. 115-1.00C.

Ishiguro, Toshiyuki: *See—*
Rokudo, Nerumitsu; Ishiguro, Toshiyuki; and Hori, Makoto, 3,904,347.

Ishihara, Shigenobu; and Kobayashi, Shoichi, to Showa Denko Kabushiki Kaisha. Resin composition of prominent adhesivity. 3,904,571, Cl. 260-31.20R.

Ishii, Takimi; Suzuki, Isao; and Nagai, Torao, to Tokyo Shibaura Electric Co., Ltd. Stripline directional coupler having bent coupling arms. 3,904,991, Cl. 333-10.000.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Kuniyasu, Tsuneo; Goto, Daizo; and Miyanari, Takayoshi, 3,904,067.

Ishiyama, Jiro, to Kikkoman Shoyu Co., Ltd. Process for producing 3′, 5′-cyclic adenylic acid with microorganism. 3,904,477, Cl. 195-28.00N.

Ishunkin, Veniamin Alexeevich: *See—*
Alekhin, Leonid Pavlovich; Anisimov, Albert Viktorovich; Vikulov, Vadim Ivanovich; Ishunkin, Veniamin Alexeevich; Kleimenov, Vyacheslav Fedorovich; Lokshin, Mikhail Zelikovich; Moshkin, Vladimir Alexandrovich; and Shapiro, Vadim Yakovlevich, 3,903,724.

Isogai, Tokio: *See—*
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Isono, Hiromasa: *See—*
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Isono, Tomoyuki: *See—*
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Isozaki, Osamu: *See—*
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Itakura, Gen: *See—*
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Itek Corporation: *See—*
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Fairbanks, Henry N.; and McCutcheon, James T., 3,904,188.
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Ito, Yoshimasa: *See—*
Onoda, Toshiaki; and Ito, Yoshimasa, 3,904,416.

Iverson, Elizabeth M.; and Iverson, Kenneth G. Ornamental coating method and articles. 3,904,791, Cl. 427-277.000.

Iverson, Kenneth G.: *See—*
Iverson, Elizabeth M.; and Iverson, Kenneth G., 3,904,791.

Iwakami, Takuya, to Nippon Electric Company, Limited. Two-port network for signal transmission equalization. 3,904,992, Cl. 333-18.000.

Iwasaki, Naoki: *See—*
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.

Iwasaki, Takashiro: *See—*
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J. I. Case Company: *See—*
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Yeske, Laurel R., 3,903,983.

J-Tec Associates, Incorporated: *See—*
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Jackle, Erwin C.: *See—*
Jackle, Erwin K.; and Jackle, Erwin C., 3,904,200.

Jackle, Erwin K.; and Jackle, Erwin C. Golf ball and tee positioning device. 3,904,200, Cl. 273-33.000.

Jackson Products Company: *See—*
Medgebow, Irving, 3,904,041.

Jacob, Adir, to LFE Corporation. Gas discharge apparatus. 3,904,529, Cl. 250-531.000.

Jacob, Jean-Baptiste: *See—*
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Jacobs, Stanley C.; and Schoener, Ronald C., to Aluminum Company of America. Effluent gas recycling and recovery in electrolytic cells for production of aluminum from aluminum chloride. 3,904,494, Cl. 204-67.000.

Jacquelin, Guy; and Fournet, Jean, to Societe d'Exploitation des Brevets Granofibre Sebreg. Methods of manufacturing fibrous granulates. 3,904,726, Cl. 264-117.000.

Jaeger, Horst, to Ciba-Geigy AG. Perfluoroalkylmonocarboxylic acid esters containing N,N'-disubstituted hydantoin groups and glycidyl groups. 3,904,644, Cl. 260-309.500.

Jakubowski, James J.: *See—*
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James, Bertram G., to Varian Associates. High power solid microwave load. 3,904,993, Cl. 333-22.00R.

James, Daniel Shaw, to du Pont de Nemours, E. I., and Company. Process for dyeing acid-modified nylon with biscationic azo dyes. 3,904,358, Cl. 8-41.00B.

Jampolsky, Arthur, to Optical Sciences Group, Inc. Flexible refracting membrane adhered to spectacle lens. 3,904,281, Cl. 351-159.000.

Janssen, John Louis Joseph Marie: *See—*
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Japanese National Railways: *See—*
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Yatagai, Shukuro; and Tamura, Katunori, 3,904,053.

Jardin, Hans, to Webasto-Werk W. Baier KG. Wind deflector for automobile with sliding roof. 3,904,239, Cl. 296-137.00J.

Jarowenko, Wadym: *See—*
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Jarvis, Harold Francis: *See—*
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Jasper, Joseph C.: *See—*
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Jean Nicolas & Fils: *See—*
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Jenkner, Herbert; and Buttgens, Walter, to Chemische Fabrik Kalk G.m.b.H. Process for the production of dibromopropyl ethers of highly halogenated aromatic compounds. 3,904,694, Cl. 260-612.00R.

Jensen, Garold K.; and McGeogh, James E., to United States of America, Navy. Radar system. 3,905,034, Cl. 343-9.000.

Jensen, Reed J., to United States of America, Energy Research and Development Administration. Hydrogen isotope separation from water. 3,904,500, Cl. 204-162.00R.

Jensen, Reed J.: *See—*
Robinson, C. Paul; Jensen, Reed J.; Davis, William C.; and Sullivan, John A., 3,904,985.

Jepsen, Tage L. B.: *See—*
Zegers, Theodoor W.; Goldberger, William M.; Jepsen, Tage L. B.; Lee, Harley C.; and Pearson, Edward P., 3,904,400.

Jeschke, Willie; and Zander, Claus-Peter, to Heidelberger Druckmaschinen Aktiengesellschaft. Means for clamping on flexible printing plates. 3,903,796, Cl. 101-415.100.

Jewell, David E.; and Schlegel, Paul D., to Gates Rubber Company, The. Windshield wiper refill. 3,903,560, Cl. 15-250.420.

Jin, Jung Il, to Stauffer Chemical Company. Flame-retardant binder comprising vinylidene halide-bis(hydrocarbyl) vinyl phosphonate polymer latices blended with antimony oxide. 3,904,570, Cl. 260-29.6TA.

Jinnai, Kazuhiko: *See—*
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John A. DeLorean Corporation: *See—*
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Johns-Manville Corporation: *See—*
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Johnson, Arthur L. Toilet flushing arrangement. 3,903,551, Cl. 4-67.00A.

Johnson, Ben C., to Thermon Manufacturing Company. Flexible heater panel. 3,904,850, Cl. 219-528.000.

Johnson, Bertram C.: *See—*
Simmons, William W.; Leppelmeier, Gilbert W.; and Johnson, Bertram C., 3,904,273.

Johnson, Charles C., to Business Equipment Center Ltd. Stenographic remote control system and apparatus. 3,905,042, Cl. 360-71.000.

Johnson, Daniel H.; and Johnson, Harry T., to Camper-Flow Mfg. Co. Wind deflector for a towed trailer. 3,904,236, Cl. 296-1.00S.

Johnson, Frank J., to Auric Corporation. Apparatus and method for continuous selective electroplating. 3,904,489, Cl. 204-15.000.

Johnson, Gordon C.; and Berube, Milton A., to Union Carbide Corporation. Sizing organic fibers. 3,904,805, Cl. 428-378.000.

Johnson, Harry T.: *See—*
Johnson, Daniel H.; and Johnson, Harry T., 3,904,236.

Johnson & Johnson: *See—*
Mesek, Frederick K.; and Repke, Virginia L., 3,903,890.

Johnson, Robert L.: *See—*
Campbell, Larry E.; and Johnson, Robert L., 3,904,553.

Johnson, William S.; Markezich, Ronald L.; and McCarry, Brian E., to Leland Stanford Junior University, The Board of Trustees of. Steroid synthesis. 3,904,698, Cl. 260-617.00R.

Johnston, James H., to United States of America, Navy. Vibrating wire attitude reference sensing system. 3,903,747, Cl. 73-505.000.

Jones, Carmen B., to General Electric Company. Turbofan engine lubrication means. 3,903,690, Cl. 60-39.080.

Jones, David Peter Marshall, to Ilford Limited. Coating apparatus. 3,903,843, Cl. 118-412.000.

Jones, Frederick W., to United States of America, Navy. Securing system for jet engine testing of aircraft. 3,904,154, Cl. 244-110.00R.

Jones, Freeman B., Jr.; and Govan, Ronald M., to Rockwell International Corporation. Homeotropic alignment of liquid crystals in a display cell by baked on ionic surfactants. 3,904,797, Cl. 428-1.000.

Jones, H. Jack. Sidearm holsters. 3,904,091, Cl. 224-2.00B.

Jones, John E.; Lineback, Lynn D.; and Sherrill, Charles F., to Disston, Inc. Portable cordless sprayer. 3,904,116, Cl. 239-127.000.

Jones, John L.; and Rubino, Andrew M., to Armour Pharmaceutical Company. Alcohol soluble basic aluminum chlorides and method of making same. 3,904,741, Cl. 423-462.000.

Jones, Kenneth James; and Hargroves, Robert Arthur. Vehicle lamp assemblies. 3,904,864, Cl. 240-7.10R.

Jones, Robert E. Apparatus for handling and stacking bricks. 3,904,043, Cl. 214-6.00A.

Jones, Robert J.; and O'Rell, Michael K., to TRW Inc. Crosslinked polyquinoxaline polymers. 3,904,584, Cl. 260-47.0UA.

Jones, Russell P. Circular saw sharpening device. 3,903,760, Cl. 76-79.000.

Jones, Russell P. Exercise bar. 3,904,198, Cl. 272-81.000.

Jones, Vercoe C., to SI Handling Systems, Inc. Vehicle control device. 3,903,810, Cl. 104-166.000.

Jones, William Leslie; and Banks, Malcolm James Peter, to Decca Limited. Labelling machines. 3,904,466, Cl. 156-216.000.

Jordan, Fred A.: *See—*
Hagen, Magnus F.; and Jordan, Fred A., 3,904,254.

Judd, Frank Fuller; and Wilhart, Helmut, to Bell Telephone Laboratories, Incorporated. Rectifier circuit. 3,904,950, Cl. 321-27.00R.

Jujo Central Co., Ltd.: *See—*
Morinaga, Kikuo, 3,903,564.

Jury, Harold Rex; and Howells, Ronald McKenzie, to Comalco (J. & S.) Pty., Ltd. Means and method of slotting strip metal. 3,903,769, Cl. 83-37.000.

Kabushiki Kaisha Koparu: *See—*
Arai, Kiyoyuki, 3,904,283.

Kabushiki Kaisha Meidensha: *See—*
Hirano, Ikuro, 3,904,953.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Hikida, Ryotaro; Hayashi, Yasutaka; Arakawa, Hideo; and Mori, Takahiko, 3,904,251.
Komatsu, Noboru; Suzuki, Takatoshi; Yamamoto, Nobuyuki; and Tsuzuki, Yukikazu, 3,904,403.

Kallrath, Gottfried: *See—*
Trebinger, Karl; and Kallrath, Gottfried, 3,904,787.

Kalninsh, Arvid Yanovich: *See—*
Pormale, Milda Yanovna; Kashkina, Nadezhda Alexandrovna; Leiman, Ieva Petrovna; Kalninsh, Arvid Yanovich; Shuster, Yan; and Mikazhan, Valdis Danielovich, 3,904,600.

Kalopissis, Gregoire; and Bugaut, Andree, to Societe Anonyme dite: L'Oreal. 2-Nitro-mete-phenylenediamines. 3,904,690, Cl. 260-570.50P.

Kalthoff, Clement H.: *See—*
Cloud, Samuel P.; Kalthoff, Clement H.; Rueger, William J.; and Thompson, Timothy W., 3,904,148.

Kamatics Corporation: *See—*
Orkin, Stanley S.; and Nagy, Edward John, 3,904,731.

Kamiya, Takashi; Teraji, Tsutomu; and Hashimoto, Masashi, to Fujisawa Pharmaceutical Co., Ltd. 2,3-Lower alkylenepenam-3-carboxylic acid derivatives and processes for the preparation thereof. 3,904,607, Cl. 260-239.100.

Kamizono, Tetsushi: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Yoshioka, Tsunemi; Kamizono, Tetsushi; and Onogi, Seiji, 3,904,565.

Kamm, Vernon C.; Ioannou, John T.; and Faxon, James L., to Bendix Corporation, The. Absolute position determining system using free stylus. 3,904,822, Cl. 178-19.000.

Kanaya, Yoshinosuke; Hasegawa, Minoru; Azuma, Kanae; Ochiai, Minoru; and Shimizu, Jun, to Kohkoku Chemical Industry Co., Ltd. Electro-discharging sheet, and an electro-discharging apparatus provided with an electro-discharging electrode composed of the said sheet, and a process for electro-discharging with the said apparatus. 3,904,929, Cl. 317-2.00R.

Kane, William Paul, to du Pont de Nemours, E. I., and Company. Polyethylene terephthalate/paperboard blank and container formed from such blank. 3,904,104, Cl. 229-3.500.

Kaneda, Isamu: *See*—
Suzuki, Shigeyuki; Kaneda, Isamu; Endo, Hiroshi; Miyata, Kazuo; Horiguchi, Tadao; and Yamamoto, Kazumasa, 3,904,687.

Kanegafuchi Chemical Industry Co., Ltd.: *See*—
Matsumura, Yoshitsugu, 3,903,903.

Kaneko Company: *See*—
Kaneko, Hitoshi, 3,903,865.

Kaneko, Hitoshi, to Kaneko Company. Air popper. 3,903,865, Cl. 124-11.00R.

Kaneko, Yasuhisa; Komiyama, Yoshiro; Uchiyama, Yoshiki; Murakami, Hideki; and Maeda, Shiro, to Toyota Jidosha Kogyo Kabushiki Kaisha. Method of manufacturing aluminum alloy cylinders and cylinder liners for internal combustion engines. 3,903,951, Cl. 164-97.000.

Kannegiesser, Martin; and Knappe, Heinrich, to Herbert Kannegiesser Kommanditgesellschaft, Firma. Apparatus for folding shirts and similar articles of clothing. 3,904,090, Cl. 223-37.000.

Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, to Nippon Soda Co., Ltd. Thiazolotriazolyphosphonothioates. 3,904,639, Cl. 260-306.70E.

Kansai Paint Co., Ltd.: *See*—
Shingai, Kiyozo; Watanabe, Tadashi; Murata, Koichiro; and Isozaki, Osamu, 3,904,563.

Kao Soap Co., Ltd.: *See*—
Sakaguchi, Kahei; Moriyama, Noboru; and Takemoto, Hirotaka, 3,904,410.

Kapperman, Dorothy M., administrator: *See*—
Kipple, Harry P.; Cozzarin, Virgil J.; and Kapperman, Francis C., deceased, 3,904,724.

Kapperman, Francis C., deceased: *See*—
Kipple, Harry P.; Cozzarin, Virgil J.; and Kapperman, Francis C., deceased, 3,904,724.

Kashkina, Nadezhda Alexandrovna: *See*—
Pormale, Milda Yanovna; Kashkina, Nadezhda Alexandrovna; Leiman, Ieva Petrovna; Kalninsh, Arvid Yanovich; Shuster, Yan; and Mikazhan, Valdis Danielovich, 3,904,600.

Kaspar, Jan: *See*—
Bicik, Vladislav; and Kaspar, Jan, 3,904,133.

Kasuba, John A., to True Temper Corporation. Rail clip. 3,904,114, Cl. 238-349.000.

Katada, Takeshi; Kitamoto, Tatsuji; and Akashi, Goro, to Fuji Photo Film Co., Ltd. Method of producing ferromagnetic chromium dioxides. 3,904,538, Cl. 252-62.510.

Katayama, Hisashi: *See*—
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.

Kato, Masao: *See*—
Tanaka, Yoshio; Kato, Masao; Okada, Akira; and Shimura, Yukio, 3,904,587.

Katsumata, Mitsuo, to Kokusan Denki Co., Ltd. Signal source in use for a breakerless ignition system for an internal combustion engine. 3,903,863, Cl. 123-149.00D.

Katsuyama, Harumi; and Ono, Hisatake, to Fuji Photo Film Co., Ltd. Non-silver salt photosensitive materials. 3,904,419, Cl. 96-90.00R.

Katz, Harold. Bicycle lock assembly. 3,903,719, Cl. 70-227.000.

Katz, Ronnie, to Lawrence Peska Associates, Inc., a part interest. Incar spark plug checker. 3,904,955, Cl. 324-17.000.

Kaul, Dietmar: *See*—
Hock, Fromund; Heitmann, Knut; and Kaul, Dietmar, 3,904,295.

Kawada Kogyo Kabushiki Kaisha: *See*—
Kawata, Tadao, 3,904,376.

Kawada, Yasayuki: *See*—
Gondo, Hisashi; Nakasugi, Hajime; Mazuda, Hiroo; Kawada, Yasayuki; Chijiiwa, Rikio; and Matsuda, Shoichi, 3,904,447.

Kawai, Kazumitsu: *See*—
Otsuki, Akira; Numata, Kimikazu; and Kawai, Kazumitsu, 3,904,811.

Kawasaki, Harumi: *See*—
Aoki, Harumi; Inoue, Masahide; and Kawasaki, Harumi, 3,905,019.

Kawase, Shoji; Inata, Hiroo; and Shima, Takeo, to Teijin Limited. Stabilized polyester composition and method for stabilizing polyester. 3,904,578, Cl. 260-40.00P.

Kawata, Tadao, to Kawada Kogyo Kabushiki Kaisha. Apparatus for cleaning the discharge of a smokestack or the like. 3,904,376, Cl. 23-284.000.

Kawneer Company, Inc.: *See*—
Hubbard, S. Eugene; and Meisterheim, Richard A., 3,903,647.

Keahey, Sammie G.: *See*—
Ayres, Robert U.; McKenna, Richard P.; and Keahey, Sammie G., 3,903,806.

Keck, Donald B.; and Olshansky, Robert, to Corning Glass Works. Optical waveguide having optimal index gradient. 3,904,268, Cl. 350-96.0WG.

Keeler, Frederick D., to KLM Company, The. Tamper-proof bottle closure. 3,904,061, Cl. 215-252.000.

Keetley, Reginald George, to Caterpillar Tractor Company. Variable angle turbine nozzle actuating mechanism. 3,904,309, Cl. 415-148.000.

Keichel, Harold A. Index table. 3,903,758, Cl. 74-826.000.

Keller, Hans: *See*—
Taudt, Heinz; and Keller, Hans, 3,904,816.

Kelly, Robert C., to Upjohn Company, The. Cyclic ortho esters. 3,904,648, Cl. 260-340.900.

Kemp, Jacob D.; and Sieg, Robert P., to Chevron Research Company. Gasoline production. 3,904,384, Cl. 44-56.000.

Kempler nee Constantinesco, Aurora. Mixing tap with independent hot and cold water flow controls. 3,903,926, Cl. 137-637.000.

Kendall Company, The: *See*—
Vida, Julius A.; and Samour, Carlos M., 3,904,627.

Kendall, John Pierce: *See*—
Smith, James Robert; and Kendall, John Pierce, 3,904,351.

Kendechy, Joseph A., to Benjamin Reel Products, Inc. Self-switching retracting reel. 3,904,843, Cl. 200-153.00F.

Kendy, Leonard; and Frey, Richard L., to Hughes Aircraft Company. Laser-sight and computer for anti-aircraft gun fire control system. 3,904,163, Cl. 248-358.00R.

Kennard, John. Dental pin interface plate. 3,903,603, Cl. 32-15.000.

Kennedy, John R. Boat recovery system. 3,903,823, Cl. 114-52.000.

Kennedy, Joseph P.; and Baldwin, Francis P. Process for graft polymerization. 3,904,708, Cl. 260-878.00R.

Kenson, Robert E.; Albert, Henry J.; and Accinno, Dante J., to Engelhard Minerals & Chemicals Corporation. Catalyst and process for ammonia oxidation. 3,904,740, Cl. 423-403.000.

Kent Cambridge Medical Limited: *See*—
Woollons, David John; and English, Michael John, 3,903,897.

Kerschner, James J.: *See*—
Becht, H. Allen; Campbell, James; Kerschner, James J.; and Krollman, Edward J., 3,904,303.

Kertamus, Norbert J.; Sage, Warnie L.; and Paisley, Mark A., to Babcock & Wilcox Company, The. Fuel gas manufacture. 3,904,387, Cl. 48-210.000.

Kessler, William R., to Corning Glass Works. Electric component package. 3,904,031, Cl. 206-328.000.

Keyes Fibre Company: *See*—
Chadbourne, Gilbert R., 3,904,103.

Khokhar, Abdul Rauf: *See*—
Tobe, Martin Leslie; Khokhar, Abdul Rauf; and Braddock, Peter David Michael, 3,904,663.

Kidd, Wayne L.; and Corona, Stephen C., to Xerox Corporation. Optical system alignment apparatus. 3,904,290, Cl. 355-8.000.

Kiehs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. N-carbamoyloxyalkyl-substituted dinitroanilines. 3,904,673, Cl. 260-482.00C.

Kieper, Reinhold R. Power transmission. 3,903,749, Cl. 74-29.000.

Kiesow, Lutz A., to Baxter Laboratories, Inc. Apparatus for deriving oxygen association rate curves for blood samples. 3,904,296, Cl. 356-246.000.

Kikkoman Shoyu Co., Ltd.: *See*—
Ishiyama, Jiro, 3,904,477.

Kilmer, Earl E., to United States of America, Navy. Method for preparing heat resistant mild detonating fuse. 3,903,800, Cl. 102-27.00R.

Kim, Dong H., to American Home Products Corporation. 2,3,4,5-Tetrahydro-4,4-dialkyl-1H-1,4-benzodiazepine halides. 3,904,603, Cl. 260-239.0BD.

Kimberly-Clark Corporation: *See*—
Grupe, Edward H.; and Hechtman, John F., 3,903,794.

Kimura, Hiroyasu; and Ueda, Toshiharu, to Toyo Boseki Kabushiki Kaisha. Automatic apparatus for supplying laps to a group of combers. 3,904,050, Cl. 214-89.000.

Kimura, Kunio: *See*—
Honda, Hidemasa; Isayama, Yukio; Jinnai, Kazuhiko; and Kimura, Kunio, 3,904,377.

Kimura, Osamu: *See*—
Sagawa, Seiji; Kunihiro, Haruo; Kimura, Osamu; and Inoue, Masatoshi, 3,904,638.

King Musical Instruments, division of the Seeburg Corporation: *See*—
McCracken, George T., 3,903,779.

King, Norman B., to Badger Company, Inc., The. Ethylbenzene-styrene separation. 3,904,484, Cl. 203-52.000.

King, Robert W., to Avco Corporation. Process for making three-dimensional fabric material. 3,904,464, Cl. 156-148.000.

Kinney, Alfred W., to Phillips Petroleum Company. Separating and dispensing means for nested containers. 3,903,676, Cl. 53-314.000.

Kinney, James F.; and Gadzala, Antoni Edward, to Avon Products, Inc. Means for promoting color change in bleached or untreated hair. 3,904,357, Cl. 8-10.200.

Kipple, Harry P.; Cozzarin, Virgil J.; and Kapperman, Francis C., deceased (by Kapperman, Dorothy M., administrator), to Westinghouse Electric Corporation. Method of compacting powdered resin into slots of magnetic cores. 3,904,724, Cl. 264-71.000.

Kirchweger, Karl: *See*—
List, Hans; and Kirchweger, Karl, 3,903,849.

Kirk, Russell F.: *See*—
Moreno, Frederick E.; Kirk, Russell F.; and Foster, Jack D., 3,904,983.

Kishi, Atsuo; and Degawa, Takashi, to Hitachi, Ltd. Swash plate compressor. 3,904,320, Cl. 417-269.000.

Kishi, Hirotake: *See—*
Suzuki, Shigekazu; Shibata, Masaharu; and Kishi, Hirotake, 3,903,651.

Kishida, Katsuhiro: *See—*
Fushimi, Shingi; Kishida, Katsuhiro; and Aoki, Hiroyuki, 3,903,959.

Kitajima, Nobuo: *See—*
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo, 3,904,408.

Kitamoto, Tatsuji: *See—*
Katada, Takeshi; Kitamoto, Tatsuji; and Akashi, Goro, 3,904,538.

Kizler, Harald; and Schmidt, Peter Jurgen, to Robert Bosch G.m.b.H. Exhaust emission control system for internal combustion engines. 3,903,853, Cl. 123-32.0EA.

Klakulak, Thomas J.; and Klomp, Edward D., to General Motors Corporation. Auxiliary intake valve. 3,903,855, Cl. 123-90.140.

Klang, Daniel M., to California Computer Products, Inc. Capstan servo system. 3,904,943, Cl. 318-395.000.

Klar, Erich; Haller, Pierre; and Runge, Ernst Georg, to Siemens Aktiengesellschaft. Neutron detector. 3,904,881, Cl. 250-390.000.

Klarcrete, Limited: *See—*
Clarke, Ronald A. W., 3,904,245.

Klaue, Hermann. Disc brake coaling structure. 3,903,998, Cl. 188-71.300.

Kleimenov, Vyacheslav Fedorovich: *See—*
Alekhin, Leonid Pavlovich; Anisimov, Albert Viktorovich; Vikulov, Vadim Ivanovich; Ishunkin, Veniamin Alexeevich; Kleimenov, Vyacheslav Fedorovich; Lokshin, Mikhail Zelikovich; Moshkin, Vladimir Alexandrovich; and Shapiro, Vadim Yakovlevich, 3,903,724.

Klein, Andrew R., trustee: *See—*
Brooks, Ralph J., 3,903,997.

Klein, Friedrich, to Diehl datensysteme G.m.b.H. Circuit arrangement for interpreting the content of a register as an instruction. 3,905,021, Cl. 340-172.500.

Klein, Gerd; and Schmoll, Kurt, to Dynamit Nobel Aktiengesellschaft. Modified urea resins. 3,904,573, Cl. 260-31.80T.

Klein, Gerhart P.; and Vierou, William F., to P. R. Mallory & Co., Inc. Method for fabrication of anodes. 3,903,589, Cl. 29-570.000.

Klein, Paul E., to Modcom, Inc. Orthodontic apparatus including unitary dispenser and dispensed articles. 3,903,602, Cl. 32-14.00A.

Klein, Paul E.: *See—*
Anderson, Roland M.; and Klein, Paul E., 3,903,601.

Kleinschmidt, Johann O.; and Niem, Wolfgang, to Union Special Maschinenfabrik G.m.b.H. Edge control for machine sewing parallel edge seams. 3,903,820, Cl. 112-153.000.

Kliem, Peter O.; and Reid, Jerome L., to Polaroid Corporation. Color diffusion transfer dye image-forming material binder layers containing a water-soluble cellulose salt. 3,904,417, Cl. 96-73.000.

KLM Company, The: *See—*
Keeler, Frederick D., 3,904,061.

Klomp, Edward D.: *See—*
Klakulak, Thomas J.; and Klomp, Edward D., 3,903,855.

Klosky, John Patrick; and Maynard, James Lucian, to Addressograph Multigraph Corporation. Data entry terminal having data correction means. 3,905,022, Cl. 340-172.500.

Kluczynski, Achim: *See—*
Blank, Rudolf; and Kluczynski, Achim, 3,904,284.

Knappe, Heinrich: *See—*
Kannegiesser, Martin; and Knappe, Heinrich, 3,904,090.

Knaus, Heimo A. Dental floss holder. 3,903,907, Cl. 132-92.00R.

Knifton, John F., to Texaco Inc. Carboxylation process for preparing alpha unsaturated linear fatty acid derivatives. 3,904,672, Cl. 260-486.0AC.

Knighten, James G., to Morton-Norwich Products, Inc. Detergent film. 3,904,543, Cl. 252-174.000.

Knoblauch, Georg: *See—*
Metzler, Reinhold; and Knoblauch, Georg, 3,904,035.

Knox, Marion D., to Wayne Electronic Products Co. Programmable solid state switch. 3,905,020, Cl. 340-147.00P.

Knudson, Clarence B., to Hughey and Phillips. Voltage regulating transformer for series coupled loads. 3,904,954, Cl. 323-48.000.

Kobayashi, Kunio: *See—*
Sugimoto, Keiichi; Kobayashi, Kunio; Nishijima, Koji; and Morimoto, Shiro, 3,904,616.

Kobayashi, Shoichi: *See—*
Ishihara, Shigenobu; and Kobayashi, Shoichi, 3,904,571.

Koch, Karl-Ernst: *See—*
Hesse, Karl-Dieter; and Koch, Karl-Ernst, 3,904,498.

Koch Supplies Inc.: *See—*
Freeland, Harold L.; and Flanagan, James C., 3,903,788.

Koenig, Karl-Heinz: *See—*
Kiehs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, 3,904,673.

Koepke, Earl H.; and Reichard, Alan R., to Harter Corporation. Chair construction and method for producing same. 3,904,242, Cl. 297-452.000.

Koesy, Calvin B., to United States of America, Navy. Equipment for locating and plotting the position of underwater towed vehicles. 3,905,007, Cl. 340-3.00E.

Kohkoku Chemical Industry Co., Ltd.: *See—*
Kanaya, Yoshinosuke; Hasegawa, Minoru; Azuma, Kanae; Ochiai, Minoru; and Shimizu, Jun, 3,904,929.

Koide, Atsushi: *See—*
Yoshizawa, Masayuki; Araki, Kengo; Koide, Atsushi; and Matsuoka, Yoshitaka, 3,904,479.

Kokusan Denki Co., Ltd.: *See—*
Katsumata, Mitsuo, 3,903,863.

Kolavcic, Pavel, to Allmanna Svenska Elektriska Aktiebolaget. Compensating device in magnetoelastic transducers. 3,903,739, Cl. 73-141.00A.

Koltz, Irving Morton, to International Inpak Inc. Visual display package. 3,904,029, Cl. 206-45.340.

Kolwicz, Stanley J. Upright checkers and chess game apparatus. 3,904,206, Cl. 273-131.0AC.

Komatsu, Noboru; Suzuki, Takatoshi; Yamamoto, Nobuyuki; and Tsuzuki, Yukikazu, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Heat resisting nickel-aluminum-molybdenum alloy. 3,904,403, Cl. 75-170.000.

Kominami, Naoya: *See—*
Senoo, Saburo; Kominami, Naoya; Fukuoka, Yohei; and Sasaki, Katsuyoshi, 3,904,635.

Komiya, Osamu, to Olympus Optical Co., Ltd. Forceps means for removing cellular tissue from the body cavities. 3,903,892, Cl. 128-303.150.

Komiyama, Yoshiro: *See—*
Kaneko, Yasuhisa; Komiyama, Yoshiro; Uchiyama, Yoshiki; Murakami, Hideki; and Maeda, Shiro, 3,903,951.

Kompelien, Arlon D.: *See—*
Benz, Donald E.; Garfunkel, James H.; and Kompelien, Arlon D., 3,904,880.

Kondo, Hiroyuki: *See—*
Shimizu, Shigeki; Shinoda, Wataru; Makino, Hazime; Kondo, Hiroyuki; and Okikawa, Katuaki, 3,904,421.

Kondo, Masaki: *See—*
Kurihara, Yasuo; and Kondo, Masaki, 3,904,483.

Kondo, Michio; Nakada, Akira; Chibana, Masanobu; Futamase, Tsuyoshi; and Ohya, Akiyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 3,903,775, Cl. 84-1.010.

Kondo, Toshihiyuki, to Aisin Seiki Kabushiki Kaisha. Anti-skid brake mechanism. 3,904,250, Cl. 303-21.00F.

Koneval, Donald J., to Gould Inc. Method of making electrographic recording heads employing printed circuit techniques. 3,903,594, Cl. 29-603.000.

Konishi, Fumiya: *See—*
Takeyama, Kenichi; Morimoto, Takayoshi; and Konishi, Fumiya, 3,904,368.

Koppers Company, Inc.: *See—*
Kuehn, Frederick Reinhold, 3,904,190.

Korzekwa, Samuel M.; and Peil, William, to General Electric Company. Power supply for a thermionic emission gas discharge lamp. 3,904,925, Cl. 315-171.000.

Kosoczky, Ibolya: *See—*
Budai, Zoltan; Pallos, Laszlo; Petocz, Lujza E.; and Kosoczky, Ibolya, 3,904,628.

Kostelec, George A.; and Resch, Richard J., to Krueger Metal Products, Inc. Fiberglass shell construction with screw anchor inserts. 3,904,243, Cl. 297-457.000.

Kostelnicek, Richard J., to Exxon Production Research Company. Wellbore telemetry apparatus. 3,904,840, Cl. 191-12.00R.

Kosteruk, Valentin Petrovich; and Kovalchenko, Mikhail Savvich. Method of brazing. 3,903,585, Cl. 228-121.000.

Kostic, Eleanor E., to Raymond Lee Organization, Inc., The, a part interest. Complementary trash can unit. 3,904,218, Cl. 280-79.200.

Kovac, Michael George, to RCA Corporation. Removal of dark current spikes from image sensor output signals. 3,904,818, Cl. 178-7.100.

Kovalchenko, Mikhail Savvich: *See—*
Kosteruk, Valentin Petrovich; and Kovalchenko, Mikhail Savvich, 3,903,585.

Krakow, Heinz: *See—*
Wortmann, Ernst; and Krakow, Heinz, 3,904,096.

Kraus, Maximilian, to Siemens Aktiengesellschaft. Housing for shielding electrical devices from high frequency electromagnetic radiation interference. 3,904,810, Cl. 174-35.0MS.

Kraus, Peter B., to Clark Equipment Company. Skid-steered vehicle transmission. 3,903,978, Cl. 180-6.480.

Krauss, Otto; Eder, Hans; Niederhametner, Peter; Richter, Arend; and Zimmermann, Norbert, to Triumph Werke Nurnberg A.G. Typewriter carriage assembly. 3,904,010, Cl. 197-1.00R.

Kreidler, Alfred, to Metall-Invent S.A. Standard indicating device for vehicles with universal mounting system therefor. 3,903,836, Cl. 116-129.00R.

Krenzer, John, to Velsicol Chemical Corporation. 5-(T-butyl-1,3,4-thiadiazol-2-yl)-3-methyl-5-hydroxyimidazolidin-2-ore. 3,904,640, Cl. 260-306.80D.

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Krippene, Brett C.: *See—*
Peterson, Morris W.; Krippene, Brett C.; and Marshall, David M., 3,904,349.

Krogsrud, Harald, to Elkem-Spigerverket A/S. Apparatus for movement of a cylindrical body in axial direction. 3,903,748, Cl. 74-25.000.

Krollman, Edward J.: *See—*
Becht, H. Allen; Campbell, James; Kerschner, James J.; and Krollman, Edward J., 3,904,303.

Kross, Robert W., to Neely, George B. Mixed drink preparation apparatus. 3,904,079, Cl. 222-2.000.

Kroth, Neil W.; Lohbauer, Kenneth R.; and Scheidt, James E., to Caterpillar Tractor Company. Low-effort proportional control valve. 3,903,787, Cl. 91-462.000.

Krueger, Harold A. Tool for hanging siding or the like. 3,904,184, Cl. 269-102.000.

Krueger Metal Products, Inc.: *See—*
Kostelec, George A.; and Resch, Richard J., 3,904,243.

Krumboltz, Howard D.; and Merrill, Clayton W., to United States of America, Navy. Electronic countermeasure system. 3,905,035, Cl. 343-6.50R.

Kubicek, John: *See—*
Oser, Nathan; Niedzinski, Edmund John; Kubicek, John; and Lewis, Richard Lee, 3,904,379.

Kubinski, Donald C., to Goodyear Tire & Rubber Company, The. Tire building apparatus. 3,904,471, Cl. 156-405.000.

Kubota, Shokichi: *See—*
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Kuehn, Frederick Reinhold, to Koppers Company, Inc. Apparatus for feeding paperboard blanks. 3,904,190, Cl. 271-99.000.

Kuehn, Riley, Jr., to Boeing Company, The. Countersink sealant application method. 3,904,718, Cl. 264-39.000.

Kuhl, Burkhart, to Messerschmitt-Bolkow-Blohm G.m.b.H. Arrangement for measuring the distance between two successive objects. 3,904,157, Cl. 246-63.00C.

Kullander, Mats Ove, to Bayer Aktiengesellschaft. Reeling-up drum. 3,904,143, Cl. 242-72.00B.

Kunihiro, Haruo: *See—*
Sagawa, Seiji; Kunihiro, Haruo; Kimura, Osamu; and Inoue, Masatoshi, 3,904,638.

Kuniyasu, Tsuneo; Goto, Daizo; and Miyanari, Takayoshi, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Membrane tank for liquefied gases. 3,904,067, Cl. 220-9.0LG.

Kupersmith, Sam. Method and apparatus for cutting glass. 3,903,767, Cl. 83-7.000.

Kupper, Arthur Kurt: *See—*
Bosshard, Ulrich Walter; Kupper, Arthur Kurt; and Lohr, Manfred, 3,904,353.

Kupperman, Dennis I.: *See—*
Kupperman, Sam; and Kupperman, Dennis I., 3,904,098.

Kupperman, Sam; and Kupperman, Dennis I., to R B Toy Development Co. Loop erecting device. 3,904,098, Cl. 226-97.000.

Kureha Kagaku Kogyo K.K.: *See—*
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Suzuki, Shigeyuki; Kaneda, Isamu; Endo, Hiroshi; Miyata, Kazuo; Horiguchi, Tadao; and Yamamoto, Kazumasa, 3,904,687.

Kurihara, Takao: *See—*
Uchida, Kuniki; Araki, Kenzi; Narita, Hirosi; Fukunaka, Shiro; and Kurihara, Takao, 3,904,446.

Kurihara, Yasuo; and Kondo, Masaki, to Sumitomo Shipbuilding & Machinery Co., Ltd. Thermal cracking apparatus for hydrocarbonaceous materials of high molecular weight. 3,904,483, Cl. 196-116.000.

Kurita Water Industries Ltd.: *See—*
Suzuki, Shigeyuki; Kaneda, Isamu; Endo, Hiroshi; Miyata, Kazuo; Horiguchi, Tadao; and Yamamoto, Kazumasa, 3,904,687.

Kuroiwa, Katumasa: *See—*
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Kurth, Carl Ferdinand: *See—*
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Kurumada, Tomoyuki: *See—*
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Kurz, Wolfgang Gebhard Walter: *See—*
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Kusay, Roland Gregor Paul. Drying equipment. 3,903,611, Cl. 34-32.000.

Kuster, Walter; and Chamot, Marcel, to TVI-Television Industrielle S.A. Device for cleaning vehicle wheels. 3,903,559, Cl. 15-21.00R.

La Fave, Ivan Vallier: *See—*
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Lagow, Richard J.; Baddour, Raymond F.; Lam, David K.; and Shimp, Lawrence A., to Massachusetts Institute of Technology. Fluorine plasma synthesis for carbon monofluorides. 3,904,501, Cl. 204-164.000.

Laine, Bernard Maurice: *See—*
du Chaffaut, Jean Amaudric; Hondermarck, Jean Claude; and Laine, Bernard Maurice, 3,904,485.

Lais, Siegfried; and Reuter, Reinhold, to Schottel-Werft, Josef Becker KG. Thrust producing drive mechanism for watercrafts. 3,903,833, Cl. 115-14.000.

Lalanne, Pierre: *See—*
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Lam, David K.: *See—*
Lagow, Richard J.; Baddour, Raymond F.; Lam, David K.; and Shimp, Lawrence A., 3,904,501.

Lam, Ka Duk. Apparatus for assembling a U-shaped fastener on sheet material. 3,903,580, Cl. 29-212.00D.

Landis Lund Limited: *See—*
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Lane Company, Inc., The: *See—*
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Lane, Russell W.: *See—*
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Lang, Stanley Albert, Jr.; and Cohen, Elliott, to American Cyanamid Company. Aryl heterocyclic tetrazines and method of preparation thereof. 3,904,614, Cl. 260-241.000.

Langlie, Howard; and Berg, Albert T., Jr. Method and apparatus for protecting electric fences from lightning. 3,904,932, Cl. 317-61.000.

Lanier Electronic Laboratory, Inc.: *See—*
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Lapiere, Albert: *See—*
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La Rosa, Richard, to Hazeltine Corporation. N-way power divider with remote isolating resistors. 3,904,990, Cl. 333-9.000.

Larson, Thurston E.; Lane, Russell W.; and Neff, Chester H., to Department of Registration and Education of the State of Illinois. Method and apparatus for measuring the presence of a weak acid or a weak base in a liquid. 3,904,365, Cl. 23-230.00R.

LaRue, Thomas Alfred; and Kurz, Wolfgang Gebhard Walter, to Canadian Patents and Development Limited. Determination of nitrogenase. 3,904,481, Cl. 195-103.50R.

Lasis, Evalds; Buckler, Ernest Jack; and Dunn, John Robert, to Polysar Limited. Amine modified remoldable rubbers. 3,904,580, Cl. 260-42.470.

Lassau, Christian; and Sajus, Lucien, to Institut Francaise du Petrole, des Carburante et Lubrifiants. Process for the dehydrogenation of secondary alcohols. 3,904,692, Cl. 260-586.00P.

Lassman, Howard B.: *See—*
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Laughlin, William Patrick, to Firestone Tire & Rubber Company, The. Method of ultrasonic butt splicing reinforced tire fabric. 3,904,457, Cl. 156-73.400.

Lavanant, Pierre; and Jacob, Jean-Baptiste, to Societe Lannionnaise d'Electronique; and Compagnie Industrielle des Telecommunications Cit-Alcatel. Digital source of periodic signals. 3,905,030, Cl. 340-347.0DA.

Laverman, Royce Jay; Davis, Robert Newton; and La Fave, Ivan Vallier, to Chicago Bridge & Iron Company. Liquefied gas ship tank insulation system. 3,903,824, Cl. 114-74.00A.

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Lawrence Peska Associates, Inc.: *See—*
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Lear Siegler, Inc.: *See—*
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Leavitt, Richard I., to Mobil Oil Corporation. Treatment of cells of a hydrocarbon-consuming microorganism. 3,904,476, Cl. 195-28.00R.

Lebduska, Robert L.; and Holma, Gary M., to United States of America, Navy. Fiber optic cable connector. 3,904,269, Cl. 350-96.00C.

Lechevallier, Raymond, to Ste. d'Application Plastique Mecanique et Electronique Plastimecanique. Cupping machine for producing containers in thermoplastic film and comprising a device for placing a tape-like strip in a mold. 3,904,345, Cl. 425-501.000.

Lee, Averette T. Mass rapid system. 3,903,807, Cl. 104-131.000.

Lee, Bong Kuk; Neidleman, Saul Lewis; and Ryu, Dewey D. Y., to E. R. Squibb & Sons, Inc. 1-Amino substituted 1-cycloalkane derivatives of 6-aminopenicillanic acid. 3,904,604, Cl. 260-239.100.

Lee, Harley C.: *See—*
Zegers, Theodoor W.; Goldberger, William M.; Jepsen, Tage L. B.; Lee, Harley C.; and Pearson, Edward P., 3,904,400.

Lee, Maw-Huei. Headlight warning system. 3,905,013, Cl. 340-52.00D.

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Lee Wilson Engineering Company, Inc.: *See—*
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Lee, Yuan Ho. Cold nut former. 3,903,556, Cl. 10-76.00R.

Leeds & Northrup Company: *See—*
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Lefebvre, Philippe Pierre, to Societe Anonyme: S.T. DuPont. Cigar cutter. 3,903,598, Cl. 30-112.000.

Le Grand, Robert; Freville, Christian; and Colas, Francois, to Cegedur Societe de Transformation de l'Aluminium. Barge which can be stacked on barge-carrying ships. 3,903,822, Cl. 114-26.000.

Leidich, Arthur John, to RCA Corporation. Overvoltage protection circuit. 3,904,931, Cl. 317-16.000.

Leiman, Ieva Petrovna: *See—*
Pormale, Milda Yanovna; Kashkina, Nadezhda Alexandrovna; Leiman, Ieva Petrovna; Kalninsh, Arvid Yanovich; Shuster, Yan; and Mikazhan, Valdis Danielovich, 3,904,600.

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Leonard, Verna M. Keyboard progression teaching aid. 3,903,781, Cl. 84-471.000.
Leonard, Verna M. Primary chord organizer. 3,903,782, Cl. 84-471.000.
Leonard, Verna M. Inversion structure indicator. 3,903,783, Cl. 84-471.000.
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Les Cables de Lyon: *See—*
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Lester, David, to Polymerics, Inc. Package of pressure sensitive adhesive droplets. 3,904,038, Cl. 206-447.000.
Leuthold, Peter Eugen, to U.S. Philips Corporation. Arrangement for information transmission. 3,904,965, Cl. 325-141.000.
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Levin, Herbert L., to International Telephone and Telegraph Corporation. Circuit module rack and chassis assembly. 3,904,937, Cl. 317-120.000.
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Leyrat, Pierre Jean; and Wolf, Didier Albert, to Societe Anonyme: Poclain. Excavator tool comprising a support, an auger mounted rotatably. 3,903,973, Cl. 173-163.000.
LFE Corporation: *See—*
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Lieberman, Stephen H.; and Zirino, Alberto, to United States of America, Navy. Anodic stripping volammetry and apparatus therefor. 3,904,487, Cl. 204-1.00T.
Lief, Florence S., to University of Pennsylvania, The Trustees of the. Parainfluenza virus vaccine for the control of canine tracheobronchitis (kennel cough). 3,904,750, Cl. 424-89.000.
Lightner, Gene E. Automatic thin layer chromatographic apparatus. 3,904,372, Cl. 23-253.00R.
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Lincoln, Lewis L.; and Heseltine, Donald W., to Eastman Kodak Company. 7*a*H,8*a*H-bisbenzothiazolo[3,2-a;-3',2'-a]pyrano [3,2-c;5,6-c']dipyridinium compounds and related derivatives thereof. 3,904,637, Cl. 260-294.80A.
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Lindstrom, Olle; and Lundblad, Erik, to Allmanna Svenska Elektriska Aktiebolaget. Metal-coated diamonds in synthetic resin bonded grinding wheels. 3,904,391, Cl. 51-295.000.
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List, Hans; and Kirchweger, Karl, to List, Hans. Internal combustion engine with internal mixture formation. 3,903,849, Cl. 123-30.00C.
Little, Howard, to Little, Howard F. Water dispensing dish for animals. 3,903,845, Cl. 119-81.000.
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Looker, Robert, to Satco, Inc. Cargo container with removable doors. 3,904,064, Cl. 220-1.500.
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Losi, Salvatore; Lalanne, Pierre; Henzi, Rene; and Marka, Erwin, to Oxy Metal Industries Corporation. Gold sulfite baths containing organophosphorus compounds. 3,904,493, Cl. 204-43.00G.
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Lunden, Sidney L., to Moore-Iem, Inc. Lumber stacking apparatus. 3,904,046, Cl. 214-6.0DK.

Lunden, Sidney L., to Moore-Iem, Inc. Lumber stacking apparatus. 3,904,047, Cl. 214-6.00M.

Lundsager, Christian Bent; and Sergeys, Francis John, to W. R. Grace & Co. Process for preparing an auto exhaust catalytic converter. 3,904,551, Cl. 252-455.00R.

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Lutz, David E. Article handling system. 3,904,022, Cl. 198-85.000.

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Maekawa, Tadashi: *See—*
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Magdo, Ingrid E.; and Magdo, Steven, to International Business Machines Corporation. Method for fabricating minute openings in insulating layers during the formation of integrated circuits. 3,904,454, Cl. 156-11.000.

Magdo, Steven: *See—*
Magdo, Ingrid E.; and Magdo, Steven, 3,904,454.

Magnino, Pete Joseph, Jr.; Burgess, William B.; and Meyer, Richard R., to Ralston Purina Company. Method of forming a shaped heat set food article. 3,904,776, Cl. 426-641.000.

Mago nee Karacsony, Erzebet; Balogh, Tibor; Uskert nee Dievald, Emilia; Borsi, Jozsef; and Wolf, Lajos, to Richter Gedeon Vegyeszeti Gyar RT. Lysergic amides. 3,904,633, Cl. 260-285.500.

Mahoney, Ralph W.: *See—*
Lipo, James L.; and Mahoney, Ralph W., 3,904,014.

Maida, Saverio M. Primer coating for aluminum foil surface. 3,904,790, Cl. 427-261.000.

Maier, Elmar, to Hilti Aktiengesellschaft. Holder strip for feeding fastening elements into a setting device. 3,904,032, Cl. 206-347.000.

Maier, Gerhard; and Mruck, Hans-Joachim, to B. Maier KG. Holding device for knife sets in a shredding device. 3,904,138, Cl. 241-286.000.

Maier, Gerhard; Grube, Werner; and Schrage, Johannes, to B. Maier KG. Drum-shaped knife cage with replaceable knife sets. 3,904,139, Cl. 241-286.000.

Maier, Robert E., Jr.; and McGinnis, Joseph P., to Harris-Intertype Corporation. Hopper loading method and apparatus. 3,904,191, Cl. 271-150.000.

Maier, Sieghart, to Robert Bosch G.m.b.H. Centrifugal RPM governor for fuel injected internal combustion engines. 3,903,860, Cl. 123-140.00R.

Mailfert, Alain, to Agence Nationale de Valorisation de la Recherche (ANVAR). Linear electric motors. 3,904,898, Cl. 310-12.000.

Mailfert, Alain: *See—*
Renard, Michael Claude Albert; and Mailfert, Alain, 3,904,901.

Mair, James, to General American Transportation Corporation. Volatile vapor recovery system and method utilizing Joule Thompson expansion. 3,903,708, Cl. 62-54.000.

Mak-Rite Manufacturing Inc.: *See—*
Robinson, Arthur H., Jr., 3,903,670.

Makinen, John P., to General Motors Corporation. Vehicle headrest. 3,904,241, Cl. 297-391.000.

Makino, Hazime: *See—*
Shimizu, Shigeki; Shinoda, Wataru; Makino, Hazime; Kondo, Hiroyuki; and Okikawa, Katuaki, 3,904,421.

Malchow, Gregory L., to General Motors Corporation. Rotating machinery torque sensing arrangement. 3,903,738, Cl. 73-136.00R.

Malec, Robert E.: *See—*
Plonsker, Larry; and Malec, Robert E., 3,904,595.

Malfert, Alain, to Agence Nationale de Valorisation de la Recherche (ANVAR). Linear asynchronous electric motors. 3,904,899, Cl. 310-12.000.

Mallon, Dietmar, to Siemens Aktiengesellschaft. Compatible system for transmitting and receiving quadraphonic signals. 3,904,828, Cl. 179-15.0BT.

Mallory Batteries Limited: *See—*
Naylor, Denis; and Harris, Frederick James, 3,904,438.

Malmgren, Richard P.: *See—*
Daebler, Donald H.; and Malmgren, Richard P., 3,904,100.

Malmin, Oscar. Endodontic sealing system and apparatus. 3,903,605, Cl. 32-40.00R.

Manchester, William James, to Power Hold Products, Inc. Fluid operated compensating chuck. 3,904,214, Cl. 279-4.000.

Manduley, Flavio M.: *See—*
Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 3,904,946.

Maneck, Ernst, to Volkswagenwerk Aktiengesellschaft. Guide mechanism for sliding doors for motor vehicles. 3,903,648, Cl. 49-215.000.

Manecke, Siegfried E.: *See—*
Rosenberg, David M.; and Manecke, Siegfried E., 3,905,003.

Mann, Leland A.: *See—*
Lund, Norman; Bialy, Karol J.; Mann, Leland A.; and Woodbridge, David D., Dr., 3,904,882.

Mansei Kogyo Kabushiki Kaisha: *See—*
Goto, Kenjiro, 3,903,685.

Marchal, Philippe Albert Hippolyte; Simonnet, Jacques Louis Paul; and Verrien, Jean Prudent Fernand Rene, to Bertin & Cie; and Entreprise de Recherches et d'Activities Petrolieres (ELF). Gas-cooling process and its uses. 3,904,514, Cl. 208-340.000.

Marcil, Paul M. Non-heeling hull assembly. 3,903,827, Cl. 114-143.000.

Marforio, Nerino, to Virginio Rimoldi & C. S.p.A. Apparatus for the making of straight seams, for example false creases in trousers. 3,903,818, Cl. 112-121.150.

Marforio, Nerino, to Virginio Rimoldi & C. S.p.A. Cam thread-pulling device for the looper thread of a sewing machine. 3,903,821, Cl. 112-242.000.

Margerum, Charles. Combination carrying case and traveling desk. 3,904,003, Cl. 190-11.000.

Marin, Glenn R.: *See—*
Bennett, Albert; and Marin, Glenn R., 3,903,838.

Marine Construction & Design Co.: *See—*
Tison, Kenneth F.; and Tremoulet, Olivier L., Jr., 3,903,632.

Maringer, Robert E.; Rudnick, Alfred; and Mobley, Carroll E., to Battelle Development Corporation. Apparatus for the formation of discontinuous filaments directly from molten material. 3,904,344, Cl. 425-472.000.

Marka, Erwin: *See—*
Losi, Salvatore; Lalanne, Pierre; Henzi, Rene; and Marka, Erwin, 3,904,493.

Markezich, Ronald L.: *See—*
Johnson, William S.; Markezich, Ronald L.; and McCarry, Brian E., 3,904,698.

Marocco, Antonio, to Elge Establishment. Electro-magnetical fluid flow control valve with differential action. 3,904,168, Cl. 251-30.000.

Maroschak, Ernest J. Septic tank tee. 3,904,228, Cl. 285-156.000.

Marquis, Edgar E., to Robertshaw Controls Company. Digital clock or the like and drive unit therefor. 3,903,687, Cl. 58-125.00C.

Marshall, Anthony Roland: *See—*
Gosden, Derek Vernon; Marshall, Anthony Roland; and Robson, David George, 3,904,734.

Marshall, David M.: *See—*
Peterson, Morris W.; Krippene, Brett C.; and Marshall, David M., 3,904,349.

Martin Brinkmann AG: *See—*
Messner, Rudolf; and Zilken, Hans-Joachim, 3,903,902.

Martin, Elmore Louis, to du Pont de Nemours, E. I., and Company. 4-Halo-2,5-dialkyl-benzeneacetonitriles. 3,904,667, Cl. 260-465.00G.

Martin, Erwin Herbert Erhard: *See—*
French, Tom; and Martin, Erwin Herbert Erhard, 3,903,946.

Martin, George Roy; and Botting, John Robert. Water turbines and/or pumping apparatus incorporating said turbines. 3,904,323, Cl. 417-334.000.

Martin, Jacob H., to Massachusetts Institute of Technology. Interconnection of planar electronic structures. 3,904,934, Cl. 317-101.00D.

Martin, Kenneth G., to Rockwell International Corporation. Electromechanical system having improved electrical driving means. 3,904,938, Cl. 317-123.000.

Martin, Robert F.; MacDonald, Robert D.; and Williams, C. Alan, to Control Data Corporation. Demand driven multiplexing system. 3,904,829, Cl. 179-15.0AL.

Martinez, Enrique Ramon: *See*—
Celada, Juan; MacKay, Patrick W.; Martinez, Enrique Ramon; Villasenor, Antonio; and Viramontes, Ricardo, 3,904,397.

Martone, Ronald J.; Mueller, Peter G.; and Hindel, Robert, to Picker Corporation. Scintillation camera. 3,904,530, Cl. 250-369.000.

Marushima, Tadaaki: *See*—
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.

Marvin Glass & Associates: *See*—
Dunn, Kathy A., 3,903,640.
Licitis, Gunars, 3,904,210.

Marx, Anton, to SKF Industrial Trading and Development Company B.V. Overrunning clutch. 3,904,004, Cl. 192-41.00R.

Masaki, Tatsuo: *See*—
Hanada, Hiroshi; Kitajima, Nobuo; and Masaki, Tatsuo, 3,904,408.

Maschinenfabrik Augsburg-Nurnberg A.G.: *See*—
Ottl, Adolf; and Pfleiderer, Ernst, 3,903,753.

Maschinenfabrik u. Gusserei Netstal AG: *See*—
Neff, Engelbert; and Fehr, Jakob, 3,904,078.

Mason, Lowell M., to General Electric Company. Method for handling magnetic cores and performing winding treatment procedures. 3,903,593, Cl. 29-596.000.

Massachusetts Institute of Technology: *See*—
Lagow, Richard J.; Baddour, Raymond F.; Lam, David K.; and Shimp, Lawrence A., 3,904,501.
Martin, Jacob H., 3,904,934.

Masumoto, Mitsuhiko: *See*—
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.

Masuyama, Takeshi: *See*—
Matsuoka, Michio; Itakura, Gen; Iga, Atsushi; and Masuyama, Takeshi, 3,905,006.

Matschke, Arthur L.; and Horowitz, Jack K., to Tele Speed Communications, Inc. Printing head for matrix printer. 3,904,011, Cl. 197-1.00R.

Matsuda, Michihiko: *See*—
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,904,639.

Matsuda, Shoichi: *See*—
Gondo, Hisashi; Nakasugi, Hajime; Mazuda, Hiroo; Kawada, Yasayuki; Chijiiwa, Rikio; and Matsuda, Shoichi, 3,904,447.

Matsuda, Shozo; Tanaka, Tadashi; and Okamoto, Akira, to Nippon Steel Corporation. Weldable paint composition. 3,904,555, Cl. 252-503.000.

Matsui, Katsuaki: *See*—
Murayama, Keisuke; Morimura, Syoji; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Watanabe, Ichiro, 3,904,581.

Matsui, Kazumi; and Umemori, Takashi, to Japanese National Railways. Drive power supply system for thyristorized linear motor utilizing feeder section switches controlled by position detectors for controlling the energization of ground coils. 3,904,941, Cl. 318-135.000.

Matsui, Yukio: *See*—
Takada, Toshihisa; and Matsui, Yukio, 3,903,595.

Matsumoto, Kazuya, to Canon Kabushiki Kaisha. Reconstruction method of an optically recorded signal. 3,904,835, Cl. 179-100.30G.

Matsumoto, Masao: *See*—
Sekido, Satoshi; Fukuda, Sadau; Matsumoto, Masao; and Murakami, Kaoru, 3,904,434.

Matsumoto, Shuzo, to Hitachi, Ltd. Dynamic convergence correction device. 3,904,918, Cl. 315-13.00C.

Matsumoto, Takoa, to Tomy Kogyo Co., Inc. Simulated tennis game. 3,904,203, Cl. 273-85.00R.

Matsumura, Yoshiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Reversible projector slide change of the slide stack type. 3,904,287, Cl. 353-114.000.

Matsumura, Yoshitsugu, to Kanegafuchi Chemical Industry Co., Ltd., a part interest. Method and equipment for planting hairs in sheet-form net-like material or thread form body. 3,903,903, Cl. 132-5.000.

Matsuoka, Michio; Itakura, Gen; Iga, Atsushi; and Masuyama, Takeshi. Voltage dependent resistor. 3,905,006, Cl. 338-21.000.

Matsuoka, Yoshitaka: *See*—
Yoshizawa, Masayuki; Araki, Kengo; Koide, Atsushi; and Matsuoka, Yoshitaka, 3,904,479.

Matsushita Electric Industrial Co., Inc.: *See*—
Watanabe, Masanori; and Nonomura, Kinzo, 3,904,905.

Matsushita Electric Industrial Co., Ltd.: *See*—
Rokudo, Nerumitsu; Ishiguro, Toshiyuki; and Hori, Makoto, 3,904,347.
Sato, Kohei; and Hayashi, Yoshiaki, 3,905,001.
Sekido, Satoshi; Fukuda, Sadau; Matsumoto, Masao; and Murakami, Kaoru, 3,904,434.
Takeyama, Kenichi; Morimoto, Takayoshi; and Konishi, Fumiya, 3,904,368.

Matsuura, Tamio: *See*—
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Matsuyama, Kentaro: *See*—
Nara, Shigeo; and Matsuyama, Kentaro, 3,904,783.

Matthews, Jamie F., Jr., to Exxon Production Research Company. One-way pig means. 3,903,728, Cl. 73-40.50R.

Matthews, Jamie F., Jr.; and McDonald, William M., to Exxon Production Research Company. Method of locating pipeline leaks with a one-way pig. 3,903,730, Cl. 73-40.500.

Mattis, Donald J.: *See*—
Horwitt, Laurence G.; and Mattis, Donald J., 3,904,848.

Mattis, James J.; and Tecotzky, Melvin, to United States Radium Corporation. Silicon sensitized rare earth oxysulfide phosphors. 3,904,546, Cl. 252-301.40S.

Mattone, Roberto; Sioli, Giancarlo; and Giuffre, Luigi, to Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A. Method for the preparation of pure lactam from its primary solutions in an organic solvent. 3,904,609, Cl. 260-239.30A.

Matulka, Robert D.: *See*—
Hughes, Richard Swart; and Matulka, Robert D., 3,904,981.

Maynard, James Lucian: *See*—
Klosky, John Patrick; and Maynard, James Lucian, 3,905,022.

Mayo, William E.; and Brook, John W., to M & T Chemicals Inc. Packaging stabilizer. 3,904,564, Cl. 260-23.0XA.

Mazuda, Hiroo: *See*—
Gondo, Hisashi; Nakasugi, Hajime; Mazuda, Hiroo; Kawada, Yasayuki; Chijiiwa, Rikio; and Matsuda, Shoichi, 3,904,447.

McCabe, Edward J.: *See*—
Every, Robert H., Sr.; and McCabe, Edward J., 3,904,830.

McCarry, Brian E.: *See*—
Johnson, William S.; Markezich, Ronald L.; and McCarry, Brian E., 3,904,698.

McCarthy, Jack N. Threaded bulb cover device. 3,904,865, Cl. 240-10.00L.

McCaslin, Edward Alan, to Anaconda Company, The. Cleansing apparatus. 3,903,561, Cl. 15-88.000.

McConnaughay, Kenneth E. Paving composition and method for making it. 3,904,428, Cl. 106-278.000.

McCord, Henry L., to Hughes Aircraft Company. Data processor for a doppler radar mapping system using a synthesized antenna array. 3,905,031, Cl. 343-5.0CM.

McCracken, George T., to King Musical Instruments, division of the Seeburg Corporation. Double valve arrangement for a trombone. 3,903,779, Cl. 84-395.000.

McCutcheon, James T.: *See*—
Fairbanks, Henry N.; and McCutcheon, James T., 3,904,188.

McDonald, William M.: *See*—
Matthews, Jamie F., Jr.; and McDonald, William M., 3,903,730.

McDougal, John A.; and Lennington, John W., to Linayer Corporation. Internal combustion engine ignition system and cleaning device. 3,903,856, Cl. 123-117.00R.

McEwan, William S.; and Hammond, Peter R., to United States of America, Navy. Continuously variable, reversible optical filter. 3,904,868, Cl. 250-201.000.

McFarland, William F.: *See*—
Gilles, John R.; McFarland, William F.; and Spears, Jess W., 3,904,027.

McFarlane, Richard H. Coil form. 3,905,002, Cl. 336-136.000.

McGeogh, James E.: *See*—
Jensen, Garold K.; and McGeogh, James E., 3,905,034.

McGinnis, Joseph P.: *See*—
Maier, Robert E., Jr.; and McGinnis, Joseph P., 3,904,191.

McGinnis, Robert S.: *See*—
Donnelly, Thomas H.; and McGinnis, Robert S., 3,904,771.

McGrath, James L.: *See*—
Dawson, Robert H.; and McGrath, James L., 3,904,814.

McGraw, Charles T., to United States of America, Navy. Method and means of generating gravity waves. 3,903,798, Cl. 102-10.000.

McIntosh, Duane E., to General Motors Corporation. Method and apparatus for encoding and decoding digital data. 3,905,029, Cl. 340-347.0DD.

McKenna, Richard P.: *See*—
Ayres, Robert U.; McKenna, Richard P.; and Keahey, Sammie G., 3,903,806.

McKenzie, Eugene L., to Minnesota Mining and Manufacturing Company. Mark-resistant glare-free paint composition. 3,904,560, Cl. 260-22.00A.

McKenzie, Lewis A.: *See*—
Bass, Joseph A.; McKenzie, Lewis A.; and Powers, Frank M., 3,904,180.

McKillip, William J., to Ashland Oil, Inc. Hair setting preparations. 3,904,749, Cl. 424-71.000.

McKinney, Ray, Jr; and Hofferbert, William L., to United States of America, Interior. Reverse osmosis process using crosslinked aromatic polyamide membranes. 3,904,519, Cl. 210-23.000.

McManus, James M., to Pfizer Inc. Tricyclicazaindole derivatives. 3,904,645, Cl. 260-326.50B.

McNamara, John E., to Digital Equipment Corporation. Printed circuit board testing unit. 3,904,861, Cl. 235-153.0AC.

McPhee, Charles J., to American Hospital Supply Corporation. Three barrier closure system for medical liquid container. 3,904,060, Cl. 215-251.000.

McRoskey, John W.; and Swartz, Delbert D. Compartmented powder dispersing device. 3,904,087, Cl. 222-193.000.
McWilliams, James. Anti-false fire alarm system. 3,905,027, Cl. 340-304.000.
Mead Corporation, The: *See*—
Forrer, Homer W., 3,904,036.
Mears, Adrian Leonard: *See*—
Hilsum, Cyril; and Mears, Adrian Leonard, 3,904,924.
Medgebow, Irving, to Jackson Products Company. Commercial kitchen rack structure. 3,904,041, Cl. 211-72.000.
Medical Dispenser Company, The: *See*—
Richardson, James E.; and Swain, Stephen C., 3,904,075.
Mediscience Technology Corporation: *See*—
Shakespeare, Charles B., 3,903,874.
Megumi, Naomitsu, to Megumi, Naomitsu; and Tokyo Plywood Kabushiki Kaisha. Structural unit body and a structure assembled of the unit bodies. 3,903,668, Cl. 52-405.000.
Mehl, Jack Judson, to Becton, Dickinson and Company. Method for the cultivation of microorganisms from body fluid. 3,904,482, Cl. 195-109.000.
Meiji Seika Kaisha, Ltd.: *See*—
Takenaga, Mitsuhiro; and Okada, Akira, 3,904,755.
Meinecke, Klaus; Wilhelm, Dieter; Coir, Leo; Tillack, Jurgen; Samulowitz, Helmut; and Gebhardt, Karl, to U.S. Philips Corporation. Sealed beam headlight. 3,904,904, Cl. 313-113.000.
Meisterheim, Richard A.: *See*—
Hubbard, S. Eugene; and Meisterheim, Richard A., 3,903,647.
Mek-Tronix Laboratories: *See*—
Every, Robert H., Sr.; and McCabe, Edward J., 3,904,830.
Meloy Laboratories, Inc.: *See*—
Lucero, Daniel P.; and Teets, Alan R., 3,904,849.
Mendell, Lester W., Jr.: *See*—
Zane, Ronald S. O.; and Mendell, Lester W., Jr., 3,903,579.
Mengler, Claus-Dieter; and Schuller, Hans-Peter, to Chemische Werke Huls Aktiengesellschaft. Continuous process for the production of 1,1,6,6-tetraisopropyl-2,5-diaza-1,5-hexadiene. 3,904,688, Cl. 260-566.00R.
Mercier, Jacques H. Apparatus for molding bladders. 3,904,337, Cl. 425-128.000.
Mercurio, Andrew, to Rohm & Haas Company. Articles and method for forming them using heatfusible coatings from aqueous dispersions of water-insoluble polymers. 3,904,795, Cl. 427-375.000.
Meredith, Joel B.: *See*—
Gellatly, Robert K.; Meredith, Joel B.; and Green, Richard A., 3,903,698.
Merrigan, Herman J., to Seeburg Corporation, The. Selection display apparatus for coin-operated vending machine. 3,904,271, Cl. 350-112.000.
Merrill, Clayton W.: *See*—
Krumboltz, Howard D.; and Merrill, Clayton W., 3,905,035.
Mertz, David L.; and Caton, Robert L., to Carpenter Technology Corporation. Corrosion resistant austenitic stainless steel. 3,904,401, Cl. 75-125.000.
Mesek, Frederick K.; and Repke, Virginia L., to Johnson & Johnson. Disposable diaper of simple construction. 3,903,890, Cl. 128-287.000.
Messerschmitt-Bolkow-Blohm G.m.b.H.: *See*—
Kuhl, Burkhart, 3,904,157.
Messner, Rudolf; and Zilken, Hans-Joachim, to Martin Brinkmann AG. Device for filling cigarette tubes. 3,903,902, Cl. 131-70.000.
Metabi, Tsuneyo: *See*—
Noguchi, Yoshiro; and Metabi, Tsuneyo, 3,904,275.
Metall-Invent S.A.: *See*—
Kreidler, Alfred, 3,903,836.
Metallic Valve Company Limited, The: *See*—
Brookman, Donald, 3,903,921.
Metayer, Albert. Convertible sofa-bed furniture. 3,903,553, Cl. 5-36.000.
Metrailer, Charles E. Variable height transport carriage. 3,904,216, Cl. 280-43.000.
Metro, Stephen J.; Shaub, Harold; and Tao, Frank, to Exxon Research and Engineering Company. Lubricant compositions containing phosphates of fused ring halo-aromatic compounds. 3,904,536, Cl. 252-46.700.
Metzler, Reinhold; and Knoblauch, Georg, to Georg Knoblauch Werkzeugkassetten-fabrik. Receptacle with hinged closure flaps. 3,904,035, Cl. 206-379.000.
Meyer, Richard R.: *See*—
Magnino, Pete Joseph, Jr.; Burgess, William B.; and Meyer, Richard R., 3,904,776.
Michael, Sherman M. Support base. 3,904,158, Cl. 248-23.000.
Michel, Billy J. Method of repairing soldered connections. 3,903,581, Cl. 29-401.000.
Michelet, Jacques: *See*—
Antoine, Jacques; Alberny, Robert; and Michelet, Jacques, 3,903,955.
Microwave Associates, Inc.: *See*—
Stinehelfer, Harold Eugene, Sr., 3,904,997.
Miericke, Jurgen; Hieronymus, Hans; and Pawlitschek, Franz, to Siemens Aktiengesellschaft. Electromagnetic suspension guidance system for a moving vehicle. 3,903,809, Cl. 104-148.0SS.
Miguel Lopez Penalver, S.A.: *See*—
Penalver, Miguel Lopez, 3,903,622.
Mikazhan, Valdis Danielovich: *See*—
Pormale, Milda Yanovna; Kashkina, Nadezhda Alexandrovna; Leiman, Ieva Petrovna; Kalninsh, Arvid Yanovich; Shuster, Yan; and Mikazhan, Valdis Danielovich, 3,904,600.
Milberger, Ernest C.; and Dolhyj, Serge R., to Standard Oil Company, The. Synthesis of maleic anhydride. 3,904,653, Cl. 260-346.800.
Milbourne, Benjamin K., Sr. Safety closure for an aerosol container. 3,904,088, Cl. 222-402.110.
Milchem Incorporated: *See*—
Greenfield, George L., 3,904,522.
Miles, Garry N. Car drying apparatus. 3,903,562, Cl. 15-301.000.
Miller Electric Manufacturing Company: *See*—
Risberg, Robert L., 3,904,846.
Miller, Joe Jed: *See*—
Lo, Ching-Tsan; Miller, Joe Jed; and Cywinski, Norbert Francis, 3,904,703.
Mills, Ivor W., to Sun Oil Company of Pennsylvania. Process comprising solvent extraction of a blended oil. 3,904,507, Cl. 208-14.000.
Milstein, Donald: *See*—
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Minaki, Toshiaki: *See*—
Aoki, Susumu; Minaki, Toshiaki; and Mori, Kentaro, 3,904,424.
Minatoya, Hiroaki; Tullar, Benjamin F.; and Conway, Walter D., to Sterling Drug Inc. Esters of 3-(hydroxy or hydroxymethyl)-4-hydroxyphenyl aminomethyl ketones. 3,904,671, Cl. 260-473.00R.
Minigrip, Inc.: *See*—
Noguchi, Takashi, 3,904,468.
Minkiewicz, Edmond Andre, to Societe Entrepose G.T.M. pour les Travaux Petroliers Maritimes, E.T.P.M. Method and device for simulating welding operations. 3,904,845, Cl. 219-124.000.
Minnesota Mining and Manufacturing Company: *See*—
Anderson, George de W.; and Watts, Ronald E., 3,904,620.
Buelow, Joseph S.; and Reid, Thomas S., 3,903,888.
Groff, Gaylord L., 3,904,813.
McKenzie, Eugene L., 3,904,560.
Shevlin, Thomas S., 3,904,778.
Minolta Camera Kabushiki Kaisha: *See*—
Noguchi, Yoshiro; and Metabi, Tsuneyo, 3,904,275.
Minster Machine Company, The: *See*—
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Mishihara, Toshikazu: *See*—
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Mitchell, Richard E., to Sun Ventures, Inc. Reaction of alkylbenzenes with conjugated dienes. 3,904,702, Cl. 260-668.00B.
Mitsubishi Chemical Industries Ltd.: *See*—
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Yoshioka, Tsunemi; Kamizono, Tetsushi; and Onogi, Seiji, 3,904,565.
Mitsubishi Denki Kabushiki Kaisha: *See*—
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Molina, Orlando G., to Rockwell International Corporation. Liquid dye penetrant composition containing a wax. 3,904,545, Cl. 252-301.20P.
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Moreno, Frederick E.; Kirk, Russell F.; and Foster, Jack D., to GTE Sylvania Incorporated. Parasitic mode suppressor for high power lasers. 3,904,983, Cl. 331-94.50C.
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Morse, Raymond A. Venturi-type water aerator. 3,904,393, Cl. 55-228.000.
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Murayama, Keisuke; Morimura, Syoji; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Watanabe, Ichiro, to Sankyo Company Limited. Stabilization of synthetic polymers. 3,904,581, Cl. 260-45.80N.
Murayama, Naohiro; and Oikawa, Takao, to Kureha Kagaku Kogyo K.K. Method of measuring vibrations by means of piezoelectric body and the apparatus therefor. 3,903,733, Cl. 73-71.400.
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Musillo, Robert G. Cigarette wrapper construction. 3,903,899, Cl. 131-15.00R.

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Neiditch, Oscar W.; and Rudy, Jerome, to Lever Brothers Company. Fabric conditioners. 3,904,533, Cl. 252-8.800.
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Neubauer, John P. Filament reinforced fiberboard for boxes. 3,904,800, Cl. 428-186.000.
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Noguchi, Yoshiro; and Metabi, Tsuneyo, to Minolta Camera Kabushiki Kaisha. Mechanism for focusing differently spaced objects. 3,904,275, Cl. 350-175.0FS.

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Noren, Tore H.; and Federighi, George J. Apparatus for washing, rinsing, and sterilizing dishes. 3,903,909, Cl. 134-58.00D.

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North Atlantic Industries, Inc.: *See—*
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North Electric Company: *See—*
Wintz, Paul A.; Sergo, John R., Jr.; and Song, Ching-Long, 3,905,028.

Northern Natural Gas Company: *See—*
Smith, James Robert; and Kendall, John Pierce, 3,904,351.

Northrop, Donald P.: *See—*
Emidy, Thomas J.; Northrop, Donald P.; Thorington, Luke; and Olsen, Andrew Henry, 3,904,916.

Norton, Raymond F., to Outboard Marine Corporation. Flame arrestor. 3,903,646, Cl. 48-192.000.

Nosker, Richard William; and Fox, Leonard P., to RCA Corporation. True replication of soft substrates. 3,904,488, Cl. 204-5.000.

Nova-Werke AG: *See—*
Ruedi, Joseph; Vielmo, Oskar; and Weinhandl, Franz, 3,904,321.

Novick, William J., Jr.; and Lassman, Howard B., to American Hoechst Corporation. Method of preventing thrombosis. 3,904,761, Cl. 424-274.000.

Numata, Kimikazu: *See—*
Otsuki, Akira; Numata, Kimikazu; and Kawai, Kazumitsu, 3,904,811.

O'Brien, Kevin C.; and Reasenberg, Robert D. Alternating force magnetometer. 3,904,956, Cl. 324-345.000.

Ochiai, Minoru: *See—*
Kanaya, Yoshinosuke; Hasegawa, Minoru; Azuma, Kanae; Ochiai, Minoru; and Shimizu, Jun, 3,904,929.

Oertel, Harald: *See—*
Zorn, Bruno; Noll, Klaus; Oertel, Harald; and Traubel, Harro, 3,904,796.

Oertle, Donald H., to Continental Oil Company. Electrical connector. 3,904,264, Cl. 339-94.00C.

Office Nationale d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See—*
Ribaud, Yves, 3,904,308.

Ofsevit, David S.: *See—*
Vrabel, Joseph D.; Gosselin, Dennis W.; Sussman, Eugene Donald; and Ofsevit, David S., 3,905,012.

Oftedahl, Edwin N., to Eastman Kodak Company. Phosphine sensitized photographic silver halide emulsions and elements. 3,904,415, Cl. 96-107.000.

Ogren, Sven-Ove: *See—*
Carnmalm, Bernt Sigfrid Emanuel; de Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 3,904,691.

O'Hara, Francis Joseph, to Girdler Chemical Inc. Dehyrogenation catalyst. 3,904,552, Cl. 252-458.000.

Ohta, Noriyuki: *See—*
Murayama, Keisuke; Morimura, Syoji; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Watanabe, Ichiro, 3,904,581.

Ohya, Akiyoshi: *See—*
Kondo, Michio; Nakada, Akira; Chibana, Masanobu; Futamase, Tsuyoshi; and Ohya, Akiyoshi, 3,903,775.

Oikawa, Takao: *See—*
Murayama, Naohiro; and Oikawa, Takao, 3,903,733.

Okada, Akira: *See—*
Takenaga, Mitsuhiro; and Okada, Akira, 3,904,755.
Tanaka, Yoshio; Kato, Masao; Okada, Akira; and Shimura, Yukio, 3,904,587.

Okada, Hisao; and Murakami, Shigetoshi, to Sony Corporation. Driving circuit for a channel selecting system. 3,904,967, Cl. 325-390.000.

Okada, Tokio: *See—*
Yazawa, Masahide; and Okada, Tokio, 3,904,334.

Okamoto, Akira: *See—*
Matsuda, Shozo; Tanaka, Tadashi; and Okamoto, Akira, 3,904,555.

Okikawa, Katuaki: *See—*
Shimizu, Shigeki; Shinoda, Wataru; Makino, Hazime; Kondo, Hiroyuki; and Okikawa, Katuaki, 3,904,421.

O'Konski, Theodore S., to Wheeling-Pittsburgh Steel Corporation. Clip attachable to metal stud for support of lateral bracing. 3,904,162, Cl. 248-223.000.

O'Lear, Robert M., to United States of America, Navy. Logic circuit for true and complement digital data transfer. 3,904,891, Cl. 307-238.000.

Olenzek, Richard T.; Petrak, Herman H.; Hoffman, Carl S.; and Louzecky, Paul J., to General Motors Corporation. Rotary combustion engine. 3,903,847, Cl. 123-8.070.

Olin Corporation: *See—*
Altekruse, Richard D., 3,903,814.
Schnabel, Wilhelm J.; and Colafati, Ralph A., III, 3,904,666.

Olinkraft, Inc.: *See—*
Booth, Vernard S., 3,904,105.

Oliver, Alton D.: *See—*
Chronister, Clyde H.; Grieger, Cecil C.; Oliver, Alton D.; and Benefield, Roy W., 3,904,171.

Oliver, Richard B. Dental tool. 3,903,606, Cl. 32-40.00R.

Olofsson, Sigfrid M.; and Wickenberg, Chester H., to UPD Industries, Inc. Expeller pump. 3,904,325, Cl. 417-512.000.

Olsen, Andrew Henry: *See—*
Emidy, Thomas J.; Northrop, Donald P.; Thorington, Luke; and Olsen, Andrew Henry, 3,904,916.

Olshansky, Robert: *See—*
Keck, Donald B.; and Olshansky, Robert, 3,904,268.

Olson, Hilding Matthews, Jr., to Bell Telephone Laboratories, Incorporated. Impatt diode testing. 3,904,962, Cl. 324-158.00D.

Olson, Robert P. External regulation of internal air vent structure for hammermill. 3,904,132, Cl. 241-59.000.

Olson, Robert P. Regrinding structure for hammermill. 3,904,134, Cl. 241-73.000.

Olympus Optical Co., Ltd.: *See—*
Komiya, Osamu, 3,903,892.
Satoh, Ken, 3,904,975.
Terada, Masaaki, 3,903,877.

Omi, Kokichi; and Inoue, Shunzo, to Canon Kabushiki Kaisha. Microfilm reader. 3,904,286, Cl. 353-71.000.

Omiya, Tetsuo: *See—*
Ebukuro, Rinzou; Isono, Tomoyuki; and Omiya, Tetsuo, 3,904,872.

Omnifac Corporation: *See—*
Doench, Thomas Judson, 3,905,014.

Omotani, Kazuo. Glass lined injector. 3,903,886, Cl. 128-218.0DA.

Ono, Hisatake: *See—*
Katsuyama, Harumi; and Ono, Hisatake, 3,904,419.

Onoda, Toshiaki; and Ito, Yoshimasa. Multistage cylinder. 3,904,416, Cl. 92-52.000.

Onoda, Toshiaki; and Kubota, Shokichi, to Tokico Ltd. Steam reforming device. 3,904,722, Cl. 261-64.00R.

Onogi, Seiji: *See—*
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Yoshioka, Tsunemi; Kamizono, Tetsushi; and Onogi, Seiji, 3,904,565.

Opti Holding AG.: *See—*
Takagi, Yoshiko, 3,903,572.

Optical Sciences Group, Inc.: *See—*
Jampolsky, Arthur, 3,904,281.

Optyker, Georges Jacques: *See—*
Duchon, Yves Bernard; and Optyker, Georges Jacques, 3,903,716.

O'Rell, Michael K.: *See—*
Jones, Robert J.; and O'Rell, Michael K., 3,904,584.

Orkin, Stanley S.; and Nagy, Edward John, to Kamatics Corporation. Molded plastic bearing assembly. 3,904,731, Cl. 264-242.000.

Ormco Corporation: *See—*
Snead, Wilford A., 3,903,604.

Osanai, Takenori: *See—*
Chiba, Kazuo; and Osanai, Takenori, 3,904,516.

Osawa, Mitsuoki; and Urade, Toshinori, to Fujitsu Ltd. Plasma display panel including an opaque, reinforcing film. 3,904,906, Cl. 313-188.000.

Osborne, Michael Bryon. Method of and apparatus for filling flowable material into open top containers. 3,903,938, Cl. 141-1.000.

Oser, Nathan; Niedzinski, Edmund John; Kubicek, John; and Lewis, Richard Lee, to Johns-Manville Corporation. Telescoping reflective thermal insulating structure. 3,904,379, Cl. 29-191.000.

Osheroff, Gene W., to Fluidtech Corporation. Fluidic control mechanism. 3,904,310, Cl. 415-152.000.

Oster Corporation: *See—*
Schaefer, George Henry; and Elger, John Herbert, 3,904,073.

Ostrop, Berthold, to Gewerkschaft Eisenhutte Westfalia. Bit assembly. 3,904,247, Cl. 299-91.000.

Oswald, Alexis A.; and Valint, Paul L., Jr., to Exxon Research and Engineering Company. Pesticidal O,S'-dialkyl S-phenylthioalkyl dithiophosphates and preparation thereof. 3,904,710, Cl. 260-949.000.

Oswald, Alexis A.; and Schmit, George N., to Exxon Research & Engineering Co. Preparing unsymmetrical dithiophosphonic acid diesters. 3,904,711, Cl. 260-968.000.

Otala, Matti Nillo Tapani, to U.S. Philips Corporation. Magnetic domain storage disk. 3,905,040, Cl. 360-59.000.

Otsuki, Akira; Numata, Kimikazu; and Kawai, Kazumitsu, to Fujikura Cable Works, Limited, The. Overhead transmission lines with damper means for preventing galloping oscillations. 3,904,811, Cl. 174-42.000.

Ottl, Adolf; and Pfleiderer, Ernst, to Maschinenfabrik Augsburg-Nurnberg A.G. Composite piston rod for high power reciprocating engines. 3,903,753, Cl. 74-579.00E.

Oude Alink, Bernardus A., to Petrolite Corporation. Use of ion exchange resins in preparing tetrahydropyrimidines. 3,904,625, Cl. 260-251.00R.

Outboard Marine Corporation: *See—*
Irgens, Finn T., 3,903,995.
Norton, Raymond F., 3,903,646.
Van Rens, Russell J., 3,904,330.

Owen, Sterling W., III. Banjo capodastro. 3,903,776, Cl. 84-318.000.

Owens-Corning Fiberglas Corporation: *See—*
Dunn, John William, 3,904,339.

Owens-Illinois, Inc.: *See—*
Amberg, Stephen W.; Doherty, Thomas E.; and Heyne, Clarence A., 3,903,768.
Hinson, David C., 3,904,915.

Oxy Metal Industries Corporation: *See—*
Losi, Salvatore; Lalanne, Pierre; Henzi, Rene; and Marka, Erwin, 3,904,493.
Neumann, John W.; and Mackie, Harry A., 3,904,255.

Oy, Valmet: *See—*
Vesamaa, Erkki, 3,903,631.

Ozaki, Sadao: *See—*
Takahashi, Noboru; Chiba, Koji; Nakamura, Mutsuaki; Ozaki, Sadao; Isono, Hiromasa; Naruse, Tunehide; Mishihara, Toshikazu; and Fukushima, Iwao, 3,904,448.

P. R. Mallory & Co., Inc.: *See—*
Dey, Arabinda N.; and Holmes, Robert W., 3,904,432.
Klein, Gerhart P.; and Vierou, William F., 3,903,589.
Murphy, Peter C.; and Lawrence, J. Richard, 3,904,383.
Pomerantz, Daniel I., 3,904,782.

Pacific Magnetic Structures, Inc.: *See—*
Whetstone, Clay N., 3,903,586.

Pacific Measurements, Inc.: *See—*
Britton, Ralph H., Jr., 3,904,959.

Paddock, Paul F.; and Cramer, Jerry W., to Sunkist Growers, Inc. Apparatus to organize a mass of objects into a travelling row. 3,904,023, Cl. 198-106.000.

Page, Walter H.: *See—*
Beck, Harold D.; and Page, Walter H., 3,903,960.

Pagel, John F., to Exxon Research & Engineering Co. Process for the production of hydrogen-containing gases. 3,904,744, Cl. 423-652.000.

Pagnard, Leonard E.: *See—*
Wasco, Walter C.; Pierson, Charles W.; and Pagnard, Leonard E., 3,904,474.

Pagnotta, Gasper: *See—*
Hess, Heinrich J.; and Pagnotta, Gasper, 3,904,440.

Pahlow, Lothar, to Wilhelmsburger Maschinenfabrik Hinrichs & Sohn. Adjustable supporting structure for power tools or the like. 3,904,159, Cl. 248-23.000.

Paish, Harold Philip Sidney; and Smith, Henry, to Sykes Pumps Limited. Centrifugal pumps. 3,904,319, Cl. 417-200.000.

Paisley, Mark A.: *See—*
Kertamus, Norbert J.; Sage, Warnie L.; and Paisley, Mark A., 3,904,387.

Palac, Kazimir, to Zenith Radio Corporation. Color cathode ray tube with internal faceplate and funnel reference surfaces for unique faceplate-funnel relationship. 3,904,914, Cl. 313-482.000.

Pallos, Laszlo: *See—*
Budai, Zoltan; Pallos, Laszlo; Petocz, Lujza E.; and Kosoczky, Iboiya, 3,904,628.

Pan, Pei-Tai, to Colt Industries Operating Corporation. Method and apparatus for incinerating sludge. 3,903,813, Cl. 110-7.00B.

Paris, Rene Antoine; Amblard, Paul Alexis; and Rousset, Abel Claude. Metal cyanide complexes. 3,904,737, Cl. 423-252.000.

Parke, Davis & Company: *See—*
Elslager, Edward F.; and Worth, Donald F., 3,904,631.

Pascale, John V.: *See—*
Pittet, Alan O.; Pascale, John V.; Patton, Stuart; and Brodnitz, Michael H., 3,904,556.

Patax Trust Reg.: *See—*
Muller, Jakob, 3,903,930.

Patelli, Bianca: *See—*
Arcari, Giuliana; Bernardi, Luigi; Glasser, Alfredo; and Patelli, Bianca, 3,904,634.

Patterson, James W., to American Platform Tennis Systems. Platform tennis court. 3,904,193, Cl. 272-3.000.

Patton, Stuart: *See—*
Pittet, Alan O.; Pascale, John V.; Patton, Stuart; and Brodnitz, Michael H., 3,904,556.

Pawlitschek, Franz: *See—*
Miericke, Jurgen; Hieronymus, Hans; and Pawlitschek, Franz, 3,903,809.

Payne, Harry R., to Cavalier Corporation. Adaptable dispensing apparatus with unique escrow bar and associated latch mechanism. 3,904,076, Cl. 221-67.000.

Pearson, Edward P.: *See—*
Zegers, Theodoor W.; Goldberger, William M.; Jepsen, Tage L. B.; Lee, Harley C.; and Pearson, Edward P., 3,904,400.

Pease Company: *See—*
Pease, David H., Jr.; and Bursk, William M., 3,903,669.

Pease, David H., Jr.; and Bursk, William M., to Pease Company. Mounting assembly. 3,903,669, Cl. 52-455.000.

Peavy, Richard Edwin: *See—*
Blackwell, John; and Peavy, Richard Edwin, 3,904,596.

Pecina, Richard W.; and Froehlich, Robert J., to Respiratory Care, Inc. Variable aerosol heater with automatic temperature control. 3,903,883, Cl. 128-193.000.

Pedersen, Henry Valdemar, to Nordisk Ventilator Co. A/S. Impeller wheel for an axial flow fan. 3,904,314, Cl. 416-135.000.

Peer, Henricus Gerardus: *See—*
van den Ouweland, Godefridus Antonius Maria; and Peer, Henricus Gerardus, 3,904,655.

Peil, William: *See—*
Korzekwa, Samuel M.; and Peil, William, 3,904,925.

Pekrol, George G. Die casting machine with parting line feed. 3,903,956, Cl. 164-316.000.

Pelton, Sterling W.; and Lynch, William M., to Advanced Fibre-Glass, Ltd. Container structure. 3,904,524, Cl. 210-94.000.

Pelz, Karel; and Dobson, Thomas A., to Ayerst, McKenna & Harrison Ltd. Process for preparing new heterocyclic derivatives. 3,904,617, Cl. 260-243.00R.

Penalver, Miguel Lopez, to Miguel Lopez Penalver, S.A. Footwear layout. 3,903,622, Cl. 36-76.00R.

Penczynski, Peter, to Siemens Aktiengesellschaft. Tubular electrical conductor made up of individual superconducting conductors. 3,904,809, Cl. 174-27.000.

Penick, Joe E.: *See—*
Fagan, Frank N.; Penick, Joe E.; and Schatz, Klaus W., 3,904,548.

Peoples, John Terrance, to Bell Telephone Laboratories, Incorporated. Loop fault locater. 3,904,839, Cl. 179-175.30F.

Pepper, William, Jr. Rock climbing anchor. 3,903,785, Cl. 85-79.000.

Perpiglia, Frank Joseph, to Burroughs Corporation. Large scale multilevel information processing system employing improved failsaft techniques. 3,905,023, Cl. 340-172.500.

Perronnet, Jacques; and Taliani, Laurent, to Roussel-UCLAF. Pyrido[1,2a]pyrimidinone thiophosphates. 3,904,624, Cl. 260-251.00P.

Perrotin, Jean, to Jean Nicolas & Fils. Heavy-duty motor vehicles. 3,903,979, Cl. 180-23.000.

Perry, John C. Carburetor fuel metering valve with mid-range fuel adjustment. 3,903,925, Cl. 137-625.300.

Peters, Alan W.: *See—*
Fischer, Ronald H.; Milstein, Donald; and Peters, Alan W., 3,904,513.

Peters, Thomas E., to GTE Laboratories Incorporated. Vacuum holder in epitaxial growth apparatus. 3,903,841, Cl. 118-50.000.

Peterson, Carl J. Reverse signal alarm system. 3,905,016, Cl. 340-70.000.

Peterson, Donald E., to Allis-Chalmers Corporation. Pivotal step and battery mount. 3,903,981, Cl. 180-68.500.

Peterson, Morris W.; Krippene, Brett C.; and Marshall, David M., to Babcock & Wilcox Company, The. Fuel burner. 3,904,349, Cl. 431-184.000.

Peterson, Robert G.: *See—*
Phillips, Richard R.; and Peterson, Robert G., 3,904,277.

Petersson, Lars Henry, to AB Volvo Penta. Temperature responsive flow regulating laminated conduit. 3,904,111, Cl. 236-93.000.

Petocz, Lujza E.: *See—*
Budai, Zoltan; Pallos, Laszlo; Petocz, Lujza E.; and Kosoczky, Iboiya, 3,904,628.

Petrak, Herman H.: *See—*
Olenzek, Richard T.; Petrak, Herman H.; Hoffman, Carl S.; and Louzecky, Paul J., 3,903,847.

Petrolite Corporation: *See—*
Oude Alink, Bernardus A., 3,904,625.

Pfahl, Robert Christian, Jr.: *See—*
Chu, Tze Yao; Mollendorf, Joseph Charles; and Pfahl, Robert Christian, Jr., 3,904,102.

Pfeifer, Hans, to Commissariat a l'Energie Atomique. Supporting pivot system for a centrifuge bowl. 3,904,256, Cl. 308-159.000.

Pfeifer, Josef; Abbe, Gunter; Eppe, Rudolf; Ettelbruck, Rudiger; and Schnall, Gunther, to Agfa-Gevaert Aktiengesellschaft. Apparatus for manipulating sheets in copying machines. 3,904,192, Cl. 271-186.000.

Pfister, Herbert R., to Black and Decker Manufacturing Company, The. Portable jig-saw spindle sander. 3,903,657, Cl. 51-170.0PT.

Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., to Syntex (U.S.A.) Inc. Thioxanthone carboxylic acids and derivatives. 3,904,647, Cl. 260-328.000.

Pfizer Inc.: *See—*
Bennetch, Leonard M.; Greiner, Harry S.; Hancock, Kenneth R.; and Hoffman, Mark, 3,904,540.
Bradner, Norman R., 3,903,645.
McManus, James M., 3,904,645.

Pfleiderer, Ernst: *See—*
Ottl, Adolf; and Pfleiderer, Ernst, 3,903,753.

Pflugbeil, Mathias: *See—*
Steinberger, Siegfried; Nagel, Erich; Biedermann, Ernst; Pflugbeil, Mathias; Dreher, Karl; and Fleck, Adolf, 3,904,145.

Phelan, Richard D. Ladder locking assembly. 3,903,991, Cl. 182-93.000.

Philbrook, James E.: *See—*
Gaudette, Roger R.; Philbrook, James E.; and Thunberg, Jon C., 3,904,668.

Phillips, Donald M., to Westinghouse Electric Corporation. Method of fabricating a color display screen employing a plurality of layers of phosphors. 3,904,502, Cl. 204-181.000.

Phillips, Edwin N., to United States of America, Navy. Ultra high frequency impedance adjustment means. 3,904,995, Cl. 333-33.000.

Phillips Petroleum Company: *See—*
Anthoney, William R., 3,904,509.
Campbell, Robert W., 3,904,677.
Dollinger, Robert E., 3,904,727.
Kinney, Alfred W., 3,903,676.
Reusser, Robert E., 3,904,542.
Wilson, Newton R., 3,904,066.

Phillips, Richard R.; and Peterson, Robert G., to Pitney-Bowes, Inc. Optical hand scanner optical assembly. 3,904,277, Cl. 350-252.000.

Phillips, Ruben Verldon, to Cincinnati Milacron, Inc. Tool for removing push buttons. 3,903,577, Cl. 29-203.00H.

Phillips Screw Company: *See—*
Runton, Leslie A., 3,903,761.

Phoenix Pump Company: *See—*
Clement, Clyde H., 3,904,326.

Picker Corporation: *See—*
Martone, Ronald J.; Mueller, Peter G.; and Hindel, Robert, 3,904,530.

Pickett, Charles G., to Bio-Medical Sciences, Inc. Fluidic deposition control. 3,903,939, Cl. 141-1.000.

Pickett, M. Frank: *See—*
Sieg, George F.; Gerrish, Howard W., Jr.; Braun, John D.; and Pickett, M. Frank, 3,904,715.

Pierson, Charles W.: *See—*
Wasco, Walter C.; Pierson, Charles W.; and Pagnard, Leonard E., 3,904,474.

Pike, John E.; and Schneider, William P., to Upjohn Company, The. 10,11-Epoxides of PGA_2 and its 15-acetyl and -silyl derivatives. 3,904,657, Cl. 260-348.00C.

Pilloff, Herschel S., to United States of America, Navy. Mode-locking saturable absorber for producing picosecond and sub-picosecond optical pulses. 3,904,984, Cl. 331-94.50M.

Pine, Lloyd A., to Exxon Research and Engineering Company. Hydrocarbon conversion catalyst comprising alumina and aluminum phosphate. 3,904,550, Cl. 252-437.000.

Pino International Ltd.: *See—*
Morroni, Pino D., 3,903,754.

Pinot, Pierre, to Societe de Fabrication d'Instruments de Mesure S.F.I.M. Cassette tape recorder. 3,904,150, Cl. 242-199.000.

Pioch, Richard P., to Eli Lilly and Company. 7-Substituted cephalosporin compounds. 3,904,618, Cl. 260-243.00C.

Piper, Paul Alfred. Universal ski rack. 3,904,092, Cl. 224-29.00R.

Pisanchyn, John: *See—*
Fuhrmann, Robert; and Pisanchyn, John, 3,904,610.

Pitney-Bowes, Inc.: *See—*
Dlugos, Daniel F.; Freeman, Gerald C.; and Manduley, Flavio M., 3,904,946.
Phillips, Richard R.; and Peterson, Robert G., 3,904,277.
Schubert, Keith E., 3,903,793.

Pittet, Alan O.; Pascale, John V.; Patton, Stuart; and Brodnitz, Michael H., to International Flavors & Fragrances Inc. 4-(Methylthio)butanal fragrance modifier. 3,904,556, Cl. 252-522.000.

Plaskett, Clyde A. Method and apparatus for making reoriented reinforcing layer for multi-ply products. 3,903,575, Cl. 29-2.250.

Plaza, Alexander: *See—*
Ehling, Theodore P.; Plaza, Alexander; and Ruehli, Albert E., 3,904,886.

Pleasey Incorporated: *See—*
Goble, Arthur Richard, 3,904,350.

Plonsker, Larry; and Malec, Robert E., to Ethyl Corporation. Lubricating oil dispersant. 3,904,595, Cl. 260-132.000.

Plotz, Manfred, to Hoechst Aktiengesellschaft. Process and device for the production of irregular design effects on flat structures. 3,903,715, Cl. 68-205.00R.

Plumb, William W., to Clayton Specialties, Inc. Bagging apparatus. 3,903,675, Cl. 53-189.000.

Plummer, William T.: *See—*
Gold, Nathan; and Plummer, William T., 3,904,294.

Pluss-Staufer AG: *See—*
Delfosse, Pierre; and Bosshard, Alfred, 3,904,130.

Polak, James C., to General Motors Corporation. Gas turbine engine and hydromechanical transmission vehicle drive. 3,903,755, Cl. 74-687.000.

Polaroid Corporation: *See—*
Gold, Nathan; and Plummer, William T., 3,904,294.
Kliem, Peter O.; and Reid, Jerome L., 3,904,417.

Pole, Ernest George: *See—*
Graham, Everett Steadman; and Pole, Ernest George, 3,904,558.

Polinski, James E., to Stevens Supply Company. Charcoal lighter device. 3,903,866, Cl. 126-25.00B.

Polise, Joseph C.: *See—*
Vogt, Clifford M.; Soehngen, John W.; and Polise, Joseph C., 3,904,798.

Pollet, Robert Joseph: *See—*
Serrien, Frans Philomena; Tavernier, Bernard Hippoliet; Pollet, Robert Joseph; and Sels, Francis Jeanne, 3,904,412.

Polymer Processing Research Institute Ltd.: *See—*
Yazawa, Masahide; and Okada, Tokio, 3,904,334.

Polymerics, Inc.: *See—*
Lester, David, 3,904,038.

Polysar Limited: *See—*
Graham, Everett Steadman; and Pole, Ernest George, 3,904,558.
Lasis, Evalds; Buckler, Ernest Jack; and Dunn, John Robert, 3,904,580.

Pomerantz, Daniel I., to P. R. Mallory & Co., Inc. Method to improve the adherance of metal films deposited on glass sub-strates. 3,904,782, Cl. 427-12.000.

Pommerening, Uwe A.; and Richards, Glenn L., to Stromberg-Carlson Corporation. Tone control arrangement for electronic PABX. 3,904,831, Cl. 179-18.0GF.

Poncelet, Robert, to Siemens Aktiengesellschaft. Method and apparatus for measuring the impedance of a line. 3,904,859, Cl. 235-151.310.

Poncha, Rustom P.: *See—*
Gancy, Alan B.; and Poncha, Rustom P., 3,904,733.

Ponticello, Ignazio Salvatore: *See—*
Mowrey, Rowland George; and Ponticello, Ignazio Salvatore, 3,904,418.

Pool Guard Inc. A.B.: *See—*
Erlandsson, Leif Urban; and Alsenhag, Lennart Roland, 3,903,552.

Pormale, Milda Yanovna; Kashkina, Nadezhda Alexandrovna; Leiman, Ieva Petrovna; Kalninsh, Arvid Yanovich; Shuster, Yan; and Mikazhan, Valdis Danielovich. High-molecular derivative of 2-diethylaminoethyl-para-aminobenzoate hydrochloride and method for preparing it. 3,904,600, Cl. 260-231.00A.

Porret, Daniel: *See—*
Batzer, Hans; Habermeier, Juerger; and Porret, Daniel, 3,904,658.

Post Office, The: *See—*
Boothby, Walter Evelyn Brooke, 3,903,935.

Potschka, Joseph: *See—*
Fane, William; Potter, Dennis; and Potschka, Joseph, 3,904,230.

Potter, Dennis: *See—*
Fane, William; Potter, Dennis; and Potschka, Joseph, 3,904,230.

Powell, Jimmie L.: *See—*
Frieser, Rudolf G.; Powell, Jimmie L.; and Tummala, Rao R., 3,904,426.

Power Hold Products, Inc.: *See—*
Manchester, William James, 3,904,214.

Powers, Frank M.: *See—*
Bass, Joseph A.; McKenzie, Lewis A.; and Powers, Frank M., 3,904,180.

PPG Industries, Inc.: *See—*
Broz, Stephen E., 3,904,656.
Comperatore, John A., 3,904,460.

Prahst, Eugene D., to Heil Co., The. Self-unloading vehicle with tailgate operating mechanism. 3,904,049, Cl. 214-83.340.

Prameta Prazisionsmetall- und Kunststofferzeugnisse G. Baumann & Co.: *See—*
Grunert, Hellmuth, 3,903,566.

Prast, Gijsbert; and Schuiteman, Marten Willem, to U.S. Philips Corporation. Cold transport line. 3,904,394, Cl. 62-55.000.

Premier Industrial Corporation: *See—*
Allenbaugh, George G., 3,904,125.

Preston, William E.: *See—*
Luttrell, John L.; Preston, William E.; and Richardson, William B., 3,903,804.

Priester, Amos U., Jr., to Deering Milliken, Inc. Crushed pile fabric and method. 3,904,793, Cl. 427-369.000.

Primault, Andre, to Societe Generale de Fonderie. Method and device for enamelling the edges of sanitary articles. 3,904,128, Cl. 239-587.000.

Prince, Douglas F., to Castone Development Corporation. Concrete product manufacturing system and method. 3,904,723, Cl. 264-71.000.

Prochazka, Jan: *See—*
Horeni, Bohumir; Zid, Vladimir; Neckar, Bohuslav; and Prochazka, Jan, 3,903,714.

Procter & Gamble Company, The: *See—*
Brush, John Burke; and Hooper, Leonard Cecil, 3,903,674.

Products Engineering Co.: *See—*
Smith, Robert L.; and Worthington, Hugh, 3,904,057.

Products, Inc.: *See—*
Horwinski, Elwood R., 3,904,883.

Protectoseal Company, The: *See—*
Lisciani, Constantine; and Zehr, William J., 3,904,070.

Pugh, Toby S.; and Blackwell, Henry W., to Dresser Industries, Inc. Well blowout preventer having improved feed screw apparatus. 3,904,212, Cl. 277-126.000.

Punja, Nazim, to Imperial Chemical Industries Limited. Carbamoyloxyimino-azolidines as molluscicides. 3,904,759, Cl. 424-270.000.

Pusch, Gunter, to Chemische Fabrik Pfersee G.m.b.H. Surface active means, their manufacture and use. 3,904,661, Cl. 260-404.500.

Puterbaugh, Richard L., to Franklin Manufacturing Company. Method of assembling a refrigeration cabinet. 3,904,721, Cl. 264-46.500.

Putti, George, to Dyform Concrete (Prestressed) Ltd. Machine for extruding cement-like material into articles. 3,904,341, Cl. 425-382.000.

Quaker Oats Company, The: *See—*
Harwood, Charles C.; and Smith, George M., Jr., 3,904,775.

Quass, Donald W.: *See—*
Sair, Louis; and Quass, Donald W., 3,904,769.

Quatman, Robert J., to Chrysler Corporation. Heat sink for air conditioning apparatus. 3,903,710, Cl. 62-513.000.

Quinn, Alton Dewitt: *See*—
Wolt, John; Giacino, Christopher; Quinn, Alton Dewitt; Shuster, Edward J.; and Vinals, Joaquin F., 3,903,900.

R B Toy Development Co.: *See*—
Kupperman, Sam; and Kupperman, Dennis I., 3,904,098.

R. F. Shoup Corporation: *See*—
Shoup, Ransom F.; and Luther, Henry D., 3,904,853.

Rabstejnek, Carl V.: *See*—
Hassan, Javathu K.; and Rabstejnek, Carl V., 3,904,945.

Radlmann, Eduard; Schramm, Jurgen; and Nischk, Gunther, to Bayer Aktiengesellschaft. Polyamides with free secondary amino groups. 3,904,589, Cl. 260-78.00A.

Radscheit, Kurt: *See*—
Stache, Ulrich; Fritsch, Werner; Haede, Werner; Radscheit, Kurt; and Lindner, Ernst, 3,904,599.

Raggett, Stephen Richard: *See*—
Sword, Geoffrey; Lawrence, John Leslie; Raggett, Stephen Richard; and Blakemore, Bernard, 3,904,819.

Rainone, Nicholas J., to Westinghouse Electric Corporation. Method for preparing primer for percussion-ignitable flash lamp. 3,904,451, Cl. 149-30.000.

Ralston Purina Company: *See*—
Magnino, Pete Joseph, Jr.; Burgess, William B.; and Meyer, Richard R., 3,904,776.

Ramachandran, Kalambur G.: *See*—
Wenrich, Carl M.; and Ramachandran, Kalambur G., 3,904,890.

Ramachandran, Pallassana, to Colgate-Palmolive Company. Post-wash fabric treating method. 3,904,359, Cl. 8-137.000.

Ramsby, Sten Ingvar: *See*—
Carnmalm, Bernt Sigfrid Emanuel; de Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 3,904,691.

Rank Organisation Limited, The: *See*—
Demaine, David George Anthony; and Hall-Jackson, John Allan, 3,904,873.
Whitaker, Raymond; and Barker, Dennis William, 3,904,276.

Ravich, Leonard E., to Institute for Graphic Communication, Inc. Apparatus for single sheet photographic reproduction. 3,904,292, Cl. 355-100.000.

Ray, Archie C. Impact engraving tool. 3,903,599, Cl. 30-362.000.

Raymond Lee Organization, Inc., The: *See*—
Haight, Jimmy R., 3,903,763.
Kostic, Eleanor E., 3,904,218.

Raytheon Company: *See*—
Anderson, Gilbert E.; and Morris, George V., 3,904,137.
Spencer, Gordon R., 3,904,913.

RCA Corporation: *See*—
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Binder, Wolfgang Max, 3,903,656.
Griffin, Roger Thomas; and Hillman, Daniel Lee, 3,904,888.
Haferl, Peter Eduard, 3,904,973.
Hernqvist, Karl Gerhard, 3,904,986.
Kovac, Michael George, 3,904,818.
Leidich, Arthur John, 3,904,931.
Nosker, Richard William; and Fox, Leonard P., 3,904,488.
Shrader, Merrald Buren, 3,904,065.
Walter, Richard Kupp, 3,905,000.
Wheatley, Carl Franklin, Jr.; and Shevchenko, Oleksij, 3,904,927.

Reactor Centrum Nederland: *See*—
Theyse, Frederik Herman; Janssen, John Louis Joseph Marie; and Takes, Erick Willem Johan, 3,904,001.

Readman, John, to Sundstrand Corporation. Compartmented fuel tank. 3,903,924, Cl. 137-574.000.

Reasenberg, Robert D.: *See*—
O'Brien, Kevin C.; and Reasenberg, Robert D., 3,904,956.

Reaville, Eric T.: *See*—
Erickson, Floyd B.; Heimsch, Robert A.; and Reaville, Eric T., 3,904,411.

Reed Devices, Inc.: *See*—
Fitzpatrick, Don W., 3,904,266.

Reed, Robert E.: *See*—
Haase, Donald A.; and Reed, Robert E., 3,904,465.

Rees, James D.; and Critchlow, James A., to Xerox Corporation. Single radiation ray path for thermographic imaging and transfixing or fusing. 3,904,875, Cl. 250-317.000.

Rees, Thomas C.: *See*—
Hopfenberg, Harold B.; and Rees, Thomas C., 3,904,562.

Regensburger, Paul J.; and Jakubowski, James J., to Xerox Corporation. Xerographic plate containing photoinjecting perylene pigments. 3,904,407, Cl. 96-1.500.

Regie Nationale des Usines Renault: *See*—
Beaumont, Robert; and Bertrand, Bernard, 3,903,864.

Reichard, Alan R.: *See*—
Koepke, Earl H.; and Reichard, Alan R., 3,904,242.

Reid, Jerome L.: *See*—
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Reid, Thomas S.: *See*—
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Reilly, Eugene P.; *See*—
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Reliable Electric Company: *See*—
Dawson, Robert H.; and McGrath, James L., 3,904,814.

Relis, Matthew J.: *See*—
Andreaggi, Joseph R.; Graf, Robert J.; and Relis, Matthew J., 3,905,044.

Renard, Michael Claude Albert; and Mailfert, Alain, to Agence Nationale de Valorisation de la Recherche (ANVAR). Rotary electric machine with super-conducting winding. 3,904,901, Cl. 310-52.000.

Renner, Hermann: *See*—
Barenyi, Bela; Wilfert, Karl; and Renner, Hermann, 3,904,237.

Repke, Virginia L.: *See*—
Mesek, Frederick K.; and Repke, Virginia L., 3,903,890.

Repp, John M.; and Brown, Frank C., to Emerson Electric Co. Returnable packaging system. 3,904,030, Cl. 206-319.000.

Republic Packaging Corporation: *See*—
Anyon, Norman Raymond, 3,904,039.

Resch, Richard J.: *See*—
Kostelec, George A.; and Resch, Richard J., 3,904,243.

Research Corporation: *See*—
Sonenberg, Martin; and Yamasaki, Nobuyuki, 3,904,753.

Resler, Charles J., Jr.: *See*—
Husky, C. George; Resler, Charles J., Jr.; and Sanders, Sidney C., 3,904,725.

Respiratory Care, Inc.: *See*—
Pecina, Richard W.; and Froehlich, Robert J., 3,903,883.

Rethorst, Scott C., to Vehicle Research Corporation. Supersonic upflow wing. 3,904,151, Cl. 244-42.0CC.

Reusser, Robert E., to Phillips Petroleum Company. Azeotropic composition of fluorocarbon. 3,904,542, Cl. 252-171.000.

Reuter, Reinhold: *See*—
Lais, Siegfried; and Reuter, Reinhold, 3,903,833.

Revesz, Akos George; and Dendall, Robert John, to Communications Satellite Corporation (COMSAT). Fabrication of silicon solar cell with anti reflection film. 3,904,453, Cl. 156-3.000.

Rexnord Inc.: *See*—
Rooney, Thomas C.; and Crandall, Robert E., 3,904,714.

Reynolds, James E.: *See*—
Sorenson, Charles E.; Reynolds, James E.; and DeBaillie, Arnold A., 3,903,679.

Rhee, Jhoon Goo. Protective glove for the hand. 3,903,546, Cl. 2-16.000.

Rhone-Poulenc S.A.: *See*—
Decor, Jean-Pierre; and Goletto, Jean, 3,904,665.

Rhone-Poulenc-Textile: *See*—
Buisson, Francois, 3,904,577.

Riant, Yves: *See*—
Amingual, Daniel; Duy, Thuoc Nguyen; and Riant, Yves, 3,904,879.

Ribaud, Yves, to Office Nationale d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Supersonic centrifugal compressors. 3,904,308, Cl. 415-143.000.

Ricard, Rene; Taya, Miguel Margarit; and Aedo, Dionisio Martin, to Rocador Sociedad Anonima. Butacaine pamoate. 3,904,670, Cl. 260-472.000.

Rice, V. Louise: *See*—
Flowers, Dervin L.; and Rice, V. Louise, 3,904,784.

Rich, David W.; Smith, Matthew C.; and Zipay, Michael, to International Business Machines Corporation. Dual resist usage in construction of apertured multilayer printed circuit articles. 3,904,492, Cl. 204-38.00B.

Rich, Donald S.; and Rudnick, Norman, to Inflo Systems, Inc. Switching device. 3,904,999, Cl. 335-52.000.

Richards, Elmer A.: *See*—
Braun, Eugene R.; and Richards, Elmer A., 3,904,007.

Richards, Glenn L.: *See*—
Pommerening, Uwe A.; and Richards, Glenn L., 3,904,831.

Richardson, Billy Joe, to Southwire Company. Apparatus for pouring molten metal. 3,903,954, Cl. 164-278.000.

Richardson, James E.; and Swain, Stephen C., to Medical Dispenser Company, The. Tablet dispenser. 3,904,075, Cl. 221-5.000.

Richardson, William B.: *See*—
Luttrell, John L.; Preston, William E.; and Richardson, William B., 3,903,804.

Richter, Arend: *See*—
Krauss, Otto; Eder, Hans; Niederhametner, Peter; Richter, Arend; and Zimmermann, Norbert, 3,904,010.

Richter Gedeon Vegyeszeti Gyar RT: *See*—
Mago nee Karacsony, Erzebet; Balogh, Tibor; Uskert nee Dievald, Emilia; Borsi, Jozsef; and Wolf, Lajos, 3,904,633.

Richter, Gerhard; and Stein, Klaus, to Vorwerk & Co. Elektrowerke KG. Drive unit. 3,903,712, Cl. 64-30.00E.

Rickard, Patrick L.: *See*—
Davis, Michael I.; Loffredo, John M.; Wise, Larry E.; and Rickard, Patrick L., 3,905,025.

Ricoh Co., Ltd.: *See*—
Suzuki, Minoru, 3,903,795.
Yanagawa, Nobuyuki, 3,904,285.

Riffe, Delmar R., to White-Westinghouse Corporation. Reciprocating machine. 3,903,752, Cl. 74-579.00E.

Rifkin, Michael. Latch assembly with retainer for locking member. 3,903,717, Cl. 70-89.000.

Riker Laboratories, Inc.: *See*—
Hammar, Walton James; and Conway, Alvin C., 3,904,630.

Riley, Victor; Macnab, Ian; Timusk, John; and English, Edward, to Governing Council of the University of Toronto, The. Fibre reinforcing composites. 3,903,879, Cl. 128-91.00R.

Ripple, David Eugene, to Lubrizol Corporation, The. Novel disulfides derived from 1,2,4-thiadiazole. 3,904,537, Cl. 252-47.500.

Riquart, Christian, to Bendix Corporation, The. Braking regulator. 3,904,253, Cl. 303-22.00R.
Risberg, Robert L., to Miller Electric Manufacturing Company. Adaptive control for arc welding. 3,904,846, Cl. 219-135.000.
Riso Kagaku Corporation: *See—*
Hasegawa, Takanori; and Tsuji, Yoshio, 3,904,877.
Rivelli, Louis E.; and Barnes, Miles J., to Food Automation-Service Techniques, Inc. Deep fat frying cooking control module. 3,904,852, Cl. 219-442.000.
Rivier, Jean E. F.: *See—*
Guillemin, Roger C. L.; Brazeau, Paul E., Jr.; Burgus, Roger C.; Ling, Nicholas C.; Rivier, Jean E. F.; and Vale, Wylie W., Jr., 3,904,594.
Robert Bosch G.m.b.H.: *See—*
Honig, Gunter; and Schulz, Alfred, 3,903,857.
Kizler, Harald; and Schmidt, Peter Jurgen, 3,903,853.
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Robertaccio, Francis Leonard: *See—*
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Roberts Company: *See—*
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Robertshaw Controls Company: *See—*
Marquis, Edgar E., 3,903,687.
Rosenberg, David M.; and Manecke, Siegfried E., 3,905,003.
Robinson, Arthur H., Jr., to Mak-Rite Manufacturing Inc. Apparatus and method for hanging siding members on supporting surfaces. 3,903,670, Cl. 52-478.000.
Robinson, C. Paul; Jensen, Reed J.; Davis, William C.; and Sullivan, John A., to United States of America, Energy Research and Development Administration. Explosive laser. 3,904,985, Cl. 331-94.50G.
Robinson, George L., to Wolff Manufacturing Company. Variable pitch and width jaw for track presses. 3,903,688, Cl. 59-7.000.
Robinson, Maurice. Shuttlecock. 3,904,205, Cl. 273-106.00A.
Robison, James Ray, to International Telephone and Telegraph Corporation. Method for controlling a claus process. 3,904,370, Cl. 23-230.00A.
Robson, David George: *See—*
Gosden, Derek Vernon; Marshall, Anthony Roland; and Robson, David George, 3,904,734.
Robson, Harry E., to Exxon Research & Engineering Co. Zeolite RHO. 3,904,738, Cl. 423-328.000.
Rocador Sociedad Anonima: *See—*
Ricard, Rene; Taya, Miguel Margarit; and Aedo, Dionisio Martin, 3,904,670.
Rochling, Hans; Hartel, Kurt; and Goebel, Helmut, to Hoechst Aktiengesellschaft. Novel benzimidazoles. 3,904,621, Cl. 260-247.20B.
Rockwell International Corporation: *See—*
Brinegar, Billy M., 3,904,968.
Frankel, Milton B.; and Rowley, Gerald L., 3,904,674.
Jones, Freeman B., Jr.; and Govan, Ronald M., 3,904,797.
Martin, Kenneth G., 3,904,938.
Molina, Orlando G., 3,904,545.
Rogers, Richard K., to National Geographic Society. Globe stand and measuring device. 3,903,618, Cl. 35-46.00R.
Rogers, W. Clark, Jr.; and Snitzer, Morton, to Lane Company, Inc., The. Rocker recliner chair. 3,904,240, Cl. 297-85.000.
Rohm & Haas Company: *See—*
Mercurio, Andrew, 3,904,795.
Rohr Industries, Inc.: *See—*
Ross, James A., 3,904,949.
Rokudo, Nerumitsu; Ishiguro, Toshiyuki; and Hori, Makoto, to Matsushita Electric Industrial Co., Ltd. Combustion apparatus with ultrasonic vibrator. 3,904,347, Cl. 431-1.000.
Rollei-Werke Franke & Heidecke: *See—*
Sobotta, Reinhard, 3,904,288.
Rommel, Reiner. Tongs with a linear working stroke for pressing, perforating, separating and the like. 3,903,725, Cl. 72-410.000.
Rooney, Thomas C.; and Crandall, Robert E., to Rexnord Inc. Low-speed mechanical aerator impeller. 3,904,714, Cl. 261-91.000.
Rork, Gerald D.; and Simon, Frank N., to Honeywell Inc. Viscosimeter and densitometer apparatus. 3,903,732, Cl. 73-54.000.
Rosaz, Guy F., to Scovill Manufacturing Company. Valve assembly. 3,903,915, Cl. 137-232.000.
Rosen, Isaac Michael; Tassicker, Owen James; and Angus, David John. Implantable clamp. 3,903,894, Cl. 128-346.000.
Rosen, Karl Isac Joel, to Aktiebolaget IRO. Thread supply device for intermittent thread supply to textile machines. 3,904,141, Cl. 242-47.120.
Rosenberg, David M.; and Manecke, Siegfried E., to Robertshaw Controls Company. Electrical switch construction and parts therefor. 3,905,003, Cl. 337-54.000.
Rosenberg, Lawrence R. Waste treatment apparatus. 3,904,525, Cl. 210-150.000.
Rosenfeld, Ronald C., to Texas Instruments, Incorporated. Capacitive weighted acoustic surface wave filter. 3,904,996, Cl. 333-72.000.
Rosenlund, Iver Theodore, to du Pont de Nemours, E. I., and Company. Exhaust gas reactor supporting pins. 3,904,374, Cl. 23-277.00C.
Rosenstein, Abraham J. Combined pocket flask and denture case. 3,904,058, Cl. 215-6.000.
Ross, Edward C.: *See—*
Sullivan, Douglas C.; Ross, Edward C.; and Saelid, Per O., 3,904,443.
Ross, James A., to Rohr Industries, Inc. Apparatus and method for increasing the sinusoidal line-to-line output voltage level of any multiphase power amplifier operating at a maximum line-to-ground output voltage level. 3,904,949, Cl. 321-9.00R.
Ross, Svante Bertil: *See—*
Carnmalm, Bernt Sigfrid Emanuel; de Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 3,904,691.
Rosshirt, Hermann, to Superior Electric Company, The. Absolute numerical control system. 3,904,858, Cl. 235-151.110.
Roth, Gerd: *See—*
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Rothman, Edward A., to United Aircraft Corporation. Composite fan blade and method of construction. 3,903,578, Cl. 29-156.80H.
Roussel-UCLAF: *See—*
Derible, Pierre Henri; Humbert, Daniel; and Dumont, Claude, 3,904,586.
Perronnet, Jacques; and Taliani, Laurent, 3,904,624.
Rousset, Abel Claude: *See—*
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Rovac Corporation, The: *See—*
Edwards, Thomas C.; and Edwards, Claude, 3,904,327.
Rowe, Daniel G., III. Apparatus for forming a lap of textile fiber. 3,903,570, Cl. 19-240.000.
Rowe, Englebert L.; and Munting, Gerald R., to Upjohn Company, The. Apparatus for applying a material to small granules. 3,903,839, Cl. 118-9.000.
Rowley, Gerald L.: *See—*
Frankel, Milton B.; and Rowley, Gerald L., 3,904,674.
Royal, Douglas E.; Sevy, Jess L.; and Solomon, Gustave. Pulse contour measuring instrument. 3,903,873, Cl. 128-2.05P.
Roze, Michel: *See—*
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Rubens, Roger W.: *See—*
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Rubino, Andrew M.: *See—*
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Rubinshtein, Abram Borisovich: *See—*
Gabliya, Jury Alexandrovich; Levin, Lev Emmanuilovich; Bukharin, Evgeny Mikhailovich; Sloevsky, Fedor Ignatievich; Rubinshtein, Abram Borisovich; Avanesian, Vladimir Ambartsumovich; and Birzeniek, Indulis Krishevich, 3,903,662.
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Rudnick, Norman: *See—*
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Rudy, Jerome: *See—*
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Ruedi, Joseph; Vielmo, Oskar; and Weinhandl, Franz, to Nova-Werke AG. Feedback pressure responsive control valve for a rotary piston compressor. 3,904,321, Cl. 417-283.000.
Rueger, William J.: *See—*
Cloud, Samuel P.; Kalthoff, Clement H.; Rueger, William J.; and Thompson, Timothy W., 3,904,148.
Ruehli, Albert E.: *See—*
Ehling, Theodore P.; Plaza, Alexander; and Ruehli, Albert E., 3,904,886.
Ruff, David L., to Grefco, Inc. Insulation having a reduced thermal conductivity. 3,904,539, Cl. 252-62.000.
Rummel, Hermann, to Nixdorf Computer AG. Writing machines with fluid drive means. 3,904,013, Cl. 197-15.000.
Runge, Ernst Georg: *See—*
Klar, Erich; Haller, Pierre; and Runge, Ernst Georg, 3,904,881.
Runton, Leslie A., to Phillips Screw Company. Process for the manufacture of driver bits. 3,903,761, Cl. 76-101.00D.
Russell, Robert A.; and Hess, Irving J., to Ametek, Inc. Sliding seal parts and process of making. 3,904,405, Cl. 75-201.000.
Rustenburg Platinum Mines Limited: *See—*
Tobe, Martin Leslie; Khokhar, Abdul Rauf; and Braddock, Peter David Michael, 3,904,663.
Ruthel, Walter W.; and Evans, Leo G., to Hooker Chemicals & Plastics Corporation. Cathode busbar structure and cathode finger structure combination for an electrolytic cell. 3,904,504, Cl. 204-286.000.
Ryan, Ralph L.: *See—*
Taitel, Charles M.; and Ryan, Ralph L., 3,904,147.
Ryan, Wayne L., to Shubik, Phillipe, a part interest. Tobacco smoke filter. 3,903,898, Cl. 131-10.900.
Rylewski, Eugeniusz M. Rotary machine with rotating vane wheels circulating in spiral-like passages. 3,904,331, Cl. 418-111.000.
Ryu, Dewey D. Y.: *See—*
Lee, Bong Kuk; Neidleman, Saul Lewis; and Ryu, Dewey D. Y., 3,904,604.
S. I. Development Co.: *See—*
Canonge, Sidney J., 3,904,197.
S I G Schweizerische Industrie-Gesellschaft: *See—*
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S I G Schwiezerische Industrie-Gesellschaft: *See—*
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S.S.S. Patents Limited: *See—*
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Saelid, Per O.: *See—*
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Safe Electronic Systems A.G.: *See—*
Di Cecco, Enio; and Totti, Mario, 3,903,861.
Safe Flight Instrument Corporation: *See—*
Greene, Leonard M., 3,903,741.
Safety, Inc.: *See—*
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Uehara, Hiromichi; Arimitsu, Satoshi; and Ijuin, Yasuharu, 3,904,739.
Sagawa, Seiji; Kunihiro, Haruo; Kimura, Osamu; and Inoue, Masatoshi, to Sumitomo Chemical Company, Limited. Purification of crude 2-mercaptobenzothiazole. 3,904,638, Cl. 260-306.000.
Sage, Warnie L.: *See—*
Kertamus, Norbert J.; Sage, Warnie L.; and Paisley, Mark A., 3,904,387.
Sahrbacker, Edward V., to Lucerne Products, Inc. Trigger switch with lost motion connection. 3,904,844, Cl. 200-157.000.
Sailor Pen Co., Ltd., The: *See—*
Hori, Jiro, 3,904,297.
Sair, Louis; and Quass, Donald W., to Griffith Laboratories, Inc , The. Structured products having controlled gas-generated cells therein and methods of making them. 3,904,769, Cl. 426-104.000.
Sajus, Lucien: *See—*
Lassau, Christian; and Sajus, Lucien, 3,904,692.
Sakaguchi, Kahei; Moriyama, Noboru; and Takemoto, Hirotaka, to Kao Soap Co., Ltd. Electrophotographic copying paper. 3,904,410, Cl. 96-1.500.
Sakamoto, Yoshio: *See—*
Seki, Kunio; and Sakamoto, Yoshio, 3,904,972.
Salem, Kenneth G. Flashlight with semi-transparent lens. 3,904,867, Cl. 240-10.60R.
Salk Institute for Biological Studies, The: *See—*
Guillemin, Roger C. L.; Brazeau, Paul E., Jr.; Burgus, Roger C.; Ling, Nicholas C.; Rivier, Jean E. F.; and Vale, Wylie W., Jr., 3,904,594.
Salvo, Anthony. Hot water boiler. 3,903,868, Cl. 126-361.000.
Samour, Carlos M.: *See—*
Vida, Julius A.; and Samour, Carlos M., 3,904,627.
Samra, Herb G. Vehicle signal with through casing brackets. 3,905,017, Cl. 340-95.000.
Samulowitz, Helmut: *See—*
Meinecke, Klaus; Wilhelm, Dieter; Coir, Leo; Tillack, Jurgen; Samulowitz, Helmut; and Gebhardt, Karl, 3,904,904.
Sanada, Noriaki, to Canon Kabushiki Kaisha. Interchangeable lens for a camera. 3,904,279, Cl. 350-257.000.
Sandblom, Henry, to Allmanna Svenska Elektriska Aktiebolaget. Measuring apparatus for timber grinding mills. 3,904,857, Cl. 235-151.100.
Sanders, Sidney C.: *See—*
Husky, C. George; Resler, Charles J., Jr.; and Sanders, Sidney C., 3,904,725.
Sandoz Inc.: *See—*
Hughes, Philip A., 3,903,875.
Sanematsu, Hisato: *See—*
Chibata, Ichiro; Yamada, Shigeki; Yamamoto, Masao; and Sanematsu, Hisato, 3,904,646.
Sanjiki, Tetsutaro: *See—*
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Sankyo Company Limited: *See—*
Murayama, Keisuke; Morimura, Syoji; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Watanabe, Ichiro, 3,904,581.
Sargent, Charles L.; and Hutcheson, Edward J., to Thetford Corporation. Support stand for a self-contained toilet apparatus. 3,904,217, Cl. 280-47.250.
Sarycheva, Valentina Petrovna: *See—*
Dokunikhin, Nikolai Stepanovich; Vorozhtsov, Georgy Nikolaevich; and Sarycheva, Valentina Petrovna, 3,904,650.
Sasaki, Katsuyoshi: *See—*
Senoo, Saburo; Kominami, Naoya; Fukuoka, Yohei; and Sasaki, Katsuyoshi, 3,904,635.
Satco, Inc.: *See—*
Looker, Robert, 3,904,064.
Sato, Kohei; and Hayashi, Yoshiaki, to Matsushita Electric Industrial Co., Ltd. Oil-filled electrical instrument. 3,905,001, Cl. 336-94.000.
Sato, Masamichi; and Miyatuka, Hajime, to Fuji Photo Film Co., Ltd. Discharge recording. 3,904,752, Cl. 427-122.000.
Sato, Wasuke; and Uemura, Osamu, to Showa Denko Kabushiki Kaisha. Apparatus for manufacturing of tubular biaxially stretched film having improved thickness uniformity. 3,904,342, Cl. 425-384.000.
Satoh, Ken, to Olympus Optical Co., Ltd. Automatic gain control circuit. 3,904,975, Cl. 330-29.000.
Satokawa, Takaomi; Fujii, Tuneo; Honda, Norimasa; Asano, Kozo; Nakamura, Yukiharu; and Suzue, Seisuke, to Daikin Kogyo Co., Ltd. Fluorocarbon polymer composition and production and use thereof. 3,904,575, Cl. 260-32.80R.
Saunby, John B., to Union Carbide Corporation. Non-catalytic liquid phase oxidation of butane. 3,904,675, Cl. 260-488.00F.
Saunders, John Allen; and Cox, Barrie Searle, to National Research Development Corporation. Preparation of organosilicon polymers. 3,904,583, Cl. 260-46.50R.
Saunders, Ronald, to Mo Clamp Co. Ltd. Holder for sockets of a socket wrench. 3,904,034, Cl. 206-378.000.
Sawada, Hiroji; Mizuhara, Yasuhiro; Isogai, Tokio; and Nagai, Matao, to Hitachi, Ltd. Flyback transformer. 3,904,928, Cl. 315-410.000.
Sayles, Francis S., to Mobil Oil Corporation. Grease manufacture. 3,904,534, Cl. 252-36.000.
Sbicca, Peter J. Sprinkler head stabilizer and protector. 3,904,120, Cl. 239-201.000.
Schaefer, George Henry; and Elger, John Herbert, to Oster Corporation. Coffee maker cover retaining means. 3,904,073, Cl. 220-318.000.
Schatz, Klaus W.: *See—*
Fagan, Frank N.; Penick, Joe E.; and Schatz, Klaus W., 3,904,548.
Schechter, Berton: *See—*
Clingman, David L.; Schechter, Berton; Herman, Marvin; and Sippel, George R., 3,904,316.
Scheer, Alexander L. Nasal hemostatic device. 3,903,893, Cl. 128-325.000.
Scheidt, James E.: *See—*
Kroth, Neil W.; Lohbauer, Kenneth R.; and Scheidt, James E., 3,903,787.
Schelkmann, Wilhelm, to Vakuum Vulk Holdings Ltd. Method of retreading tires. 3,904,459, Cl. 156-96.000.
Scherbing, Frank J., to Security Devices Incorporated. Axial lock and key. 3,903,720, Cl. 70-363.000.
Schering Aktiengesellschaft: *See—*
Boroschewski, Gerhard; and Arndt, Friedrich, 3,904,669.
Boroschewski, Gerhard, Dr.; Arndt, Friedrich, Dr.; and Czyzewski, Alfred, Dr., 3,904,396.
Scheuermann, Horst; Hell, Peter-Matthias; and Burkhardt, Gottfried, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Optical brighteners containing sulfonic acid groups of the bis-styrylbenzene series. 3,904,678, Cl. 260-505.00R.
Scheuermann, Horst: *See—*
Mach, Wolfgang; and Scheuermann, Horst, 3,904,642.
Schiller, Barry. Removable buckle belt. 3,903,547, Cl. 2-321.000.
Schlegel, Paul D.: *See—*
Jewell, David E.; and Schlegel, Paul D., 3,903,560.
Schleimann-Jensen, Carl Arne, to Telefonaktiebolaget LM Ericsson. Gas-filled discharge overvoltage protector. 3,904,910, Cl. 313-325.000.
Schlotzhauer, Allan T.: *See—*
Brown, Albert E.; Schlotzhauer, Allan T.; and Newman, Douglas A., 3,904,802.
Brown, Albert E.; Schlotzhauer, Allan T.; and Newman, Douglas A., 3,904,803.
Schmidt, Peter Jurgen: *See—*
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Schmit, George N.: *See—*
Oswald, Alexis A.; and Schmit, George N., 3,904,711.
Schmitt, Ernst, to Bayer Aktiengesellschaft. Hemicyanine dyestuffs. 3,904,613, Cl. 260-240.800.
Schmoll, Kurt: *See—*
Klein, Gerd; and Schmoll, Kurt, 3,904,573.
Schnabel, Wilhelm J.; and Colafati, Ralph A., III, to Olin Corporation. Tetraisocyanate compositions. 3,904,666, Cl. 260-453.0AM.
Schnall, Gunther: *See—*
Pfeifer, Josef; Abbe, Gunter; Eppe, Rudolf; Ettelbruck, Rudiger; and Schnall, Gunther, 3,904,192.
Schneider, Fredric H. Apparatus for simultaneously fabricating a plurality of wall frame plates. 3,904,185, Cl. 269-291.000.
Schneider, William P.: *See—*
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Schnettler, Richard A.: *See—*
Suh, John T.; and Schnettler, Richard A., 3,904,680.
Schnittjer, Bradley Joseph: *See—*
Tsuchiya, William Sadayuki; and Schnittjer, Bradley Joseph, 3,904,051.
Schnitzer, Emanuel, to H. B. Zachry Company; and Frontier Engineering Corporation, part interest to each. Rotary desalting device. 3,904,122, Cl. 239-223.000.
Schockman, Robert L.: *See—*
Vorrhees, John E.; and Schockman, Robert L., 3,903,993.
Schoener, Ronald C.: *See—*
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Schofield, Paul Francis: *See—*
Hollyday, Robert David; and Schofield, Paul Francis, 3,904,265.
Scholz, Hansjurgen: *See—*
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Schrage, Johannes: *See—*
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Schramm, Jurgen: *See—*
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Schroeder, Earle E., to Allis-Chalmers Corporation. Hub locking arrangement. 3,904,301, Cl. 403-259.000.
Schroeder, Russell G., II: *See—*
Webb, Douglas E.; and Schroeder, Russell G., II, 3,904,922.
Schubert, Keith E., to Pitney-Bowes, Inc. Inking mechanism for a postage meter. 3,903,793, Cl. 101-351.000.
Schubert, Wolfgang, to Siemens Aktiengesellschaft. Luminescent screen. 3,904,903, Cl. 313-99.000.
Schubert, Wolfgang: *See—*
Christgau, Hermann; Schubert, Wolfgang; and Stachowiak, Aribert, 3,904,532.

Schuierer, Manfred, to Bruckner Apparatebau GmbH. Methods of dyeing fabric with a hydrocarbon subsequently burned. 3,904,360, Cl. 8-173.000.

Schuiteman, Marten Willem: *See—*
Prast, Gijsbert; and Schuiteman, Marten Willem, 3,904,394.

Schuller, Hans-Peter: *See—*
Mengler, Claus-Dieter; and Schuller, Hans-Peter, 3,904,688.

Schultz, Neithart; Vahlensieck, Hans-Joachim; and Gebele, Rudolf, to Dynamit Nobel Aktiengesellschaft. Process for the catalytic hydrofluorination of halogenated hydrocarbons. 3,904,701, Cl. 260-653.600.

Schulz, Alfred: *See—*
Honig, Gunter; and Schulz, Alfred, 3,903,857.

Schwartz, Herwig Josef, to Teroson Werke. Method for inhibiting transmission of airborne noise. 3,904,456, Cl. 156-71.000.

Schwartz, James W., to Zenith Radio Corporation. Cathodoluminescent display panel. 3,904,923, Cl. 315-169.0TV.

Schwartz, Robert A., to United Aircraft Corporation. Pitch change signal means with differential gearing. 3,904,315, Cl. 416-160.000.

Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, to United States of America, Agriculture. Arthropod maturation inhibitors. 3,904,773, Cl. 424-304.000.

Schwarzkopf, Anton, to Anton Schwarzkopf, Firma. Hydraulic actuated orbital amusement ride. 3,904,194, Cl. 272-49.000.

Schweitzer, Earl O., to Ardac, Inc. Receptacle for conveying coins. 3,904,021, Cl. 198-53.000.

Scott, Norman D. Clamp for attaching umbrella to lawn chair. 3,904,161, Cl. 248-43.000.

Scott Paper Company: *See—*
Hoffman, Louis S.; and Spruyt, Harry, 3,904,074.

Scott, Russell J., Jr., to Varian Associates. Mold for tacking an hexagonal bundle of glass fibers. 3,904,343, Cl. 425-472.000.

Scott, William H.; and Szymczak, Eugene B., to Sunbeam Corporation. Household food mixer. 3,904,178, Cl. 259-1.00R.

Scovill Manufacturing Company: *See—*
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Security Devices Incorporated: *See—*
Scherbing, Frank J., 3,903,720.

Seeburg Corporation, The: *See—*
Merrigan, Herman J., 3,904,271.

Seki, Kunio; and Sakamoto, Yoshio, to Hitachi, Ltd. Acoustic amplifier. 3,904,972, Cl. 330-22.000.

Sekido, Satoshi; Fukuda, Sadau; Matsumoto, Masao; and Murakami, Kaoru, to Matsushita Electric Industrial Co., Ltd. Sealed lead storage battery. 3,904,434, Cl. 136-26.000.

Selas Corporation of America: *See—*
Blaha, Emil, 3,904,788.

Sell, Victor L., to Ampex Corporation. Large, high speed two dimensional core memory. 3,905,026, Cl. 340-174.0PA.

Sels, Francis Jeanne: *See—*
Serrien, Frans Philomena; Tavernier, Bernard Hippoliet; Pollet, Robert Joseph; and Sels, Francis Jeanne, 3,904,412.

Selsam, Roger L.: *See—*
Bouyoucos, John V.; and Selsam, Roger L., 3,903,972.

Sendor, Bernard T., to Bookwrights, Inc. Self-binder for books, pamphlets and the like. 3,904,227, Cl. 281-29.000.

Senoo, Saburo; Kominami, Naoya; Fukuoka, Yohei; and Sasaki, Katsuyoshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Method for preparing N-alkyl-α,β-unsaturated amide. 3,904,635, Cl. 260-293.860.

Senoski, Walter E. Model rocket and recovery device therefor. 3,903,801, Cl. 102-34.100.

Sentementes, Thomas J.: *See—*
Bouchard, Andre C.; and Sentementes, Thomas J., 3,904,348.

Separex SA: *See—*
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Sergeys, Francis John: *See—*
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Sergo John R., Jr.: *See—*
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Serrien, Frans Philomena; Tavernier, Bernard Hippoliet; Pollet, Robert Joseph; and Sels, Francis Jeanne, to Agfa-Gevaert N.V. Method for the preparation of planographic printing plates from silver images. 3,904,412, Cl. 96-29.00L.

Sevy, Jess L.: *See—*
Royal, Douglas E.; Sevy, Jess L.; and Solomon, Gustave, 3,903,873.

Sexsmith, Frederick H.; and Gervase, Nicholas J. Urethane-maleimide system for cross-linking unsaturated elastomers. 3,904,592, Cl. 260-83.300.

Shahidi, Iraj Khatib; and Blay, Jorge Alberto, to Celanese Corporation. Polyacrylic acid having high chelation value and its production. 3,904,685, Cl. 260-537.00N.

Shakespeare, Charles B., to Mediscience Technology Corporation. Cardiographic signal processing means and method. 3,903,874, Cl. 128-2.06A.

Shank, Charles Vernon: *See—*
Dienes, Andrew; Shank, Charles Vernon; and Trozzolo, Anthony Marion, 3,904,982.

Shanklin, Earis Ray: *See—*
Ice, Charles O., Jr.; and Shanklin, Earis Ray, 3,903,912.

Shapiro, Vadim Yakovlevich: *See—*
Alekhin, Leonid Pavlovich; Anisimov, Albert Viktorovich; Vikulov, Vadim Ivanovich; Ishunkin, Veniamin Alexeevich; Kleimenov, Vyacheslav Fedorovich; Lokshin, Mikhail Zelikovich; Moshkin, Vladimir Alexandrovich; and Shapiro, Vadim Yakovlevich, 3,903,724.

Shatterproof Glass Corporation: *See—*
Carmichael, Donald C.; Chambers, Douglas L.; and Wan, Chong T., 3,904,506.

Shaub, Harold: *See—*
Metro, Stephen J.; Shaub, Harold; and Tao, Frank, 3,904,536.

Shaw, Alan: *See—*
Cuin, David Ernest; and Shaw, Alan, 3,903,671.

Shaw, Leslie Earl; and Jarvis, Harold Francis. Electrostatic powder coating process. 3,904,346, Cl. 427-29.000.

Shawhan, Elbert N., to Sun Oil Company of Pennsylvania. Lock-in filter for noise rejection. 3,904,970, Cl. 328-167.000.

Shay, Greg D.; and Griffith, James H., to Sherwin-Williams Company, The. Phenol-triazine addition products. 3,904,623, Cl. 260-249.600.

Shell Oil Company: *See—*
Beaujean, Joseph M. E., 3,904,068.
Cochran, Robert A., 3,904,248.
Harlan, James T., Jr., 3,904,801.
Ter Haar, Leonard W., 3,904,388.
Van Doorn, Petrus J. J.; Van Gestel, Antonius J. J.; and Deen, Peter J., 3,903,964.

Shelton, James R.; and Hopper, Roger J., to Goodyear Tire & Rubber Company, The. Inhibiting premature vulcanization of rubbers. 3,904,664, Cl. 260-453.00R.

Shelton, Luther L., to Industrial Research Company. Two-cycle internal combustion engine with pump means. 3,903,854, Cl. 123-65.00B.

Shema, Bernard F.: *See—*
Swered, Paul; and Shema, Bernard F., 3,904,764.

Sheridan, David S.: *See—*
Alley, Ralph D.; and Sheridan, David S., 3,903,895.

Shernoff, Donald I.; and Simpson, James H., to United States of America, Navy. Method for producing magnetic resonance cells. 3,904,260, Cl. 316-20.000.

Sherrill, Charles F.: *See—*
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Sherwin-Williams Company, The: *See—*
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Sherwood Medical Industries, Inc.: *See—*
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Shevchenko, Oleksij: *See—*
Wheatley, Carl Franklin, Jr.; and Shevchenko, Oleksij, 3,904,927.

Shevlin, Thomas S., to Minnesota Mining and Manufacturing Company. Method for storing and cooking food. 3,904,778, Cl. 426-418.000.

Shibata, Masaharu: *See—*
Suzuki, Shigekazu; Shibata, Masaharu; and Kishi, Hirotake, 3,903,651.

Shichida, Hiromichi; Tagami, Kiyoshi; and Toyoda, Kenichi, to Fujitsu Limited; and Fujitsu Fanuc Limited. Pulse operated surface motor stator. 3,904,897, Cl. 310-12.000.

Shichida, Hiromichi; and Toyoda, Kenichi, to Fujitsu Fanuc Limited. Pulse operated two-axis linear motor. 3,904,900, Cl. 310-12.000.

Shiga, Masaaki: *See—*
Shiki, Takehiko; Harada, Tadamasa; Harada, Ikuo; and Shiga, Masaaki, 3,904,221.

Shigeru, Ishimori; and Shinjiro, Otsuka, to Suzuki Motor Company Limited. Method of promoting the dispersion of solid particles in an electrolytic bath for composite electroplating of metals. 3,904,490, Cl. 204-16.000.

Shiki, Takehiko; Harada, Tadamasa; Harada, Ikuo; and Shiga, Masaaki, to Asahi Kasei Kogyo Kabushiki Kaisha. Gas generating system for the inflation of a protective bag. 3,904,221, Cl. 280-150.0AB.

Shima, Takeo: *See—*
Kawase, Shoji; Inata, Hiroo; and Shima, Takeo, 3,904,578.

Shimizu, Akira; Ichihashi, Kyozi; and Yusawa, Motoyasu, to Mitsui Petrochemical Industrie Ltd. Process for the preparation of polypropylene crimped fibers. 3,904,730, Cl. 264-171.000.

Shimizu, Jun: *See—*
Kanaya, Yoshinosuke; Hasegawa, Minoru; Azuma, Kanae; Ochiai, Minoru; and Shimizu, Jun, 3,904,929.

Shimizu, Senzo: *See—*
Huang, Ching Yun; Takashina, Naomitsu; Shimizu, Senzo; Shimoi, Masahiro; Ikegami, Masuya; Iwasaki, Naoki; Fujita, Rokuro; Marushima, Tadaaki; Katayama, Hisashi; and Masumoto, Mitsuhiko, 3,904,572.

Shimizu, Shigeki; Shinoda, Wataru; Makino, Hazime; Kondo, Hiroyuki; and Okikawa, Katuaki, to Tada Kogyo Ltd. Anticorrosive paint. 3,904,421, Cl. 106-14.000.

Shimizu, Shosaku: *See—*
Fuki, Ichiro; Shimizu, Shosaku; Yamamoto, Etsuji; and Yoshida, Masahiko, 3,903,963.

Shimoi, Masahiro: *See—*
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Shimp, Lawrence A.: *See—*
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Shimura, Yukio: *See—*
Tanaka, Yoshio; Kato, Masao; Okada, Akira; and Shimura, Yukio, 3,904,587.

Shingai, Kiyozo; Watanabe, Tadashi; Murata, Koichiro; and Isozaki, Osamu, to Kansai Paint Co., Ltd. Synthetic resin-acrylamide derivative condensation product based polymerization composition. 3,904,563, Cl. 260-22.0CB.

Shinjiro, Otsuka: *See—*
Shigeru, Ishimori; and Shinjiro, Otsuka, 3,904,490.

Shino, Masakazu. Method for spinning staples by means of the open-end system. 3,903,683, Cl. 57-156.000.

Shinoda, Wataru: *See—*
Shimizu, Shigeki; Shinoda, Wataru; Makino, Hazime; Kondo, Hiroyuki; and Okikawa, Katuaki, 3,904,421.

Shinoi, Tsuyoshi; and Murakami, Toyoshige, to Nippon Tsu Shin Kogyo K.K.; and TIE/Communications, Inc. Handsfree loudspeaking key telephone set and a switching circuit for use in a microphone and loudspeaker equipped key telephone. 3,904,834, Cl. 179-99.000.

Shinomiya, Tokuo: *See—*
Tabara, Yoshijiro; Akiyama, Hiroshi; Igawa, Masayuki; Maekawa, Tadashi; and Shinomiya, Tokuo, 3,904,804.

Shiono Koryo Kaisha Ltd.: *See—*
Yamamoto, Ryo; Yamamoto, Izuru; and Yoshizawa, Takumi, 3,904,780.

Shipley Company, Inc.: *See—*
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Shiraishi, Tetsuya: *See—*
Tsuda, Masahiko; Fujiwara, Yoshiaki; and Shiraishi, Tetsuya, 3,904,684.

Shiroki, Masami: *See—*
Nakanishi, Michio; Tahara, Tetsuya; Araki, Kazuhiko; and Shiroki, Masami, 3,904,641.

Shorrock, Stanley. Tufted carpet. 3,904,799, Cl. 428-92.000.

Shoup, Ransom F.; and Luther, Henry D., to R. F. Shoup Corporation. Stand for transporting and storing a machine. 3,904,853, Cl. 235-51.000.

Showa Denko Kabushiki Kaisha: *See—*
Ishihara, Shigenobu; and Kobayashi, Shoichi, 3,904,571.
Sato, Wasuke; and Uemura, Osamu, 3,904,342.

Shrader, Merrald Buren, to RCA Corporation. Vacuum seal for envelope portions. 3,904,065, Cl. 220-2.10R.

Shubik, Phillipe: *See—*
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Shuster, Edward J.: *See—*
Wolt, John; Giacino, Christopher; Quinn, Alton Dewitt; Shuster, Edward J.; and Vinals, Joaquin F., 3,903,900.

Shuster, Yan: *See—*
Pormale, Milda Yanovna; Kashkina, Nadezhda Alexandrovna; Leiman, Ieva Petrovna; Kalninsh, Arvid Yanovich; Shuster, Yan; and Mikazhan, Valdis Danielovich, 3,904,600.

SI Handling Systems, Inc.: *See—*
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Siddall, John B.: *See—*
Henrick, Clive A.; and Siddall, John B., 3,904,662.

Sieben, Anthony, to Canadian Patents and Development Limited. Apparatus for determining physical properties. 3,903,731, Cl. 73-54.000.

Sieg, George F.; Gerrish, Howard W., Jr.; Braun, John D.; and Pickett, M. Frank, to United States of America, Navy. Method for bonding a rocket motor liner to a solid rocket propellant grain. 3,904,715, Cl. 264-3.00R.

Sieg, Robert P.: *See—*
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Siemens Aktiengesellschaft: *See—*
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Christgau, Hermann; Schubert, Wolfgang; and Stachowiak, Aribert, 3,904,532.
Guntersdorfer, Max, 3,904,896.
Heckl, Herwig, 3,903,592.
Holtz, Joachim, 3,904,942.
Huber, Josef; and Steinmann, Gerd, 3,904,860.
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Miericke, Jurgen; Hieronymus, Hans; and Pawlitschek, Franz, 3,903,809.
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Sierzega, Ronald J. Apparatus and method for substantially removing debris from a slurry. 3,904,523, Cl. 210-79.000.

Signetics Corporation: *See—*
Beyerlein, Fritz W., 3,905,038.

Sim, James S. Y.: *See—*
Cohen, Arthur I.; Sim, James S. Y.; Van Horn, Maurice H.; Gordesky, Stanley E.; and Gordon, Stanley I., 3,904,745.

Simmons, William W.; Leppelmeier, Gilbert W.; and Johnson, Bertram C., to United States of America, Energy Research and Development Administration. Apodised aperture using rotation of plane of polarization. 3,904,273, Cl. 350-151.000.

Simon, Frank N.: *See—*
Rork, Gerald D.; and Simon, Frank N., 3,903,732.

Simonnet, Jacques Louis Paul: *See—*
Marchal, Philippe Albert Hippolyte; Simonnet, Jacques Louis Paul; and Verrien, Jean Prudent Fernand Rene, 3,904,514.

Simpson, James H.: *See—*
Shernoff, Donald I.; and Simpson, James H., 3,904,260.

Sinclair, Frederick William. Railway bogie. 3,903,811, Cl. 105-182.00R.

Sinfelt, John H.; and Carter, James L., to Exxon Research & Engineering Co. Catalyst regeneration procedure. 3,904,510, Cl. 208-140.000.

Singer Company, The: *See—*
Diamond, John A.; Sylvester, Amedeo A.; and Carver, Fred F., 3,903,614.
Dotsko, Martin, 3,903,615.

Sioli, Giancarlo: *See—*
Mattone, Roberto; Sioli, Giancarlo; and Giuffre, Luigi, 3,904,609.

Sippel, George R.: *See—*
Clingman, David L.; Schechter, Berton; Herman, Marvin; and Sippel, George R., 3,904,316.

Sjostrand, Gerald D. Method of forming bodies of foamed plastisols having alveolate exterior surfaces. 3,904,720, Cl. 264-45.500.

Skeba, Stanley A. Stitchless wallet made from a single piece. 3,903,945, Cl. 150-38.000.

SKF Industrial Trading and Development Company B.V.: *See—*
Marx, Anton, 3,904,004.

Slater, Irwin H., to Eli Lilly and Company. Treatment of parkinsonism. 3,904,757, Cl. 424-261.000.

Sleppy, William C.; and Goheen, Robert H., to Aluminum Company of America. Process for electrolytic recovery of metallic gallium. 3,904,497, Cl. 204-105.00R.

Sliva, Daniel E.: *See—*
Aycock, David F.; and Sliva, Daniel E., 3,904,547.

Sloevsky, Fedor Ignatievich: *See—*
Gabliya, Jury Alexandrovich; Levin, Lev Emmanuilovich; Bukharin, Evgeny Mikhailovich; Sloevsky, Fedor Ignatievich; Rubinshtein, Abram Borisovich; Avanesian, Vladimir Ambartsumovich; and Birzeniek, Indulis Krishevich, 3,903,662.

Smalley, Carl J. Hitch. 3,904,226, Cl. 280-486.000.

Smashey, Russell W., to General Electric Company. Composite eutectic alloy and article. 3,904,402, Cl. 75-170.000.

Smith, Arthur H., to Wagner Electric Corporation. Steering column lock. 3,903,986, Cl. 180-114.000.

Smith, Earl H., Jr., to International Election Systems Corporation. Automatic mechanical voting machine with electronic readout. 3,904,854, Cl. 235-54.00F.

Smith, Frank L., to Huss Equipment Corporation. Apparatus for transferring objects. 3,904,024, Cl. 198-119.000.

Smith, Franklin W., Jr.: *See—*
Heaviside, John B.; and Smith, Franklin W., Jr., 3,903,610.

Smith, George M., Jr.: *See—*
Harwood, Charles C.; and Smith, George M., Jr., 3,904,775.

Smith, Henry: *See—*
Paish, Harold Philip Sidney; and Smith, Henry, 3,904,319.

Smith, James H., to United States of America, Army. External load stabilization apparatus. 3,904,156, Cl. 244-118.00R.

Smith, James Robert; and Kendall, John Pierce, to Northern Natural Gas Company. Combustor and method of eliminating odors using the same. 3,904,351, Cl. 431-284.000.

Smith, Marjorie Ann M. Structural beam. 3,904,380, Cl. 29-193.000.

Smith, Matthew C.: *See—*
Rich, David W.; Smith, Matthew C.; and Zipay, Michael, 3,904,492.

Smith, Robert A.: *See—*
Carroll, Willard D., 3,903,835.

Smith, Robert B., to National Steel Corporation. Controlling electrolyte concentration in electrolytic and rinsing treatment of chrome plated steel strip. 3,904,491, Cl. 204-28.000.

Smith, Robert L.; and Worthington, Hugh, to Products Engineering Co. Log bundle conveyor. 3,904,057, Cl. 214-622.000.

Smiths Industries Limited: *See—*
Sykes, William Fillans; Weeden, Anthony Joseph; and Cleare, Ian Martin, 3,903,928.

Snead, Wilford A., to Ormco Corporation. Securing means for orthodontic appliance. 3,903,604, Cl. 32-14.00D.

Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A.: *See—*
Mattone, Roberto; Sioli, Giancarlo; and Giuffre, Luigi, 3,904,609.

Snitzer, Morton: *See—*
Rogers, W. Clark, Jr.; and Snitzer, Morton, 3,904,240.

Snyder, Byron, to Azcon Corporation. Variable speed hydraulic drive. 3,903,697, Cl. 60-421.000.

Sobotta, Reinhard, to Rollei-Werke Franke & Heidecke. Photographic slide projector. 3,904,288, Cl. 353-118.000.

Societe Anonyme de Telecommunications: *See—*
Aningual, Daniel; Duy, Thuoc Nguyen; and Riant, Yves, 3,904,879.

Societe Anonyme dite: L'Oreal: *See—*
Kalopissis, Gregoire; and Bugaut, Andree, 3,904,690.

Societe Anonyme: Nodet Gougis: *See—*
Grataloup, Xavier Roger, 3,903,970.

Societe Anonyme: Poclain: *See—*
Leyrat, Pierre Jean; and Wolf, Didier Albert, 3,903,973.
Loonis, Bernard M.; and Goddard, Richard, 3,904,299.

Societe Anonyme: S.T. DuPont: *See—*
Lefebvre, Philippe Pierre, 3,903,598.

Societe d'Assistance Technique pour Produits Nestle S.A.: *See*—
Hauser, Ivo, 3,904,063.
Societe de Fabrication d'Instruments de Mesure S.F.I.M.: *See*—
Pinot, Pierre, 3,904,150.
Societe des Procedes Modernes d'Injection Sopromi: *See*—
Monpetit, Louis, 3,904,856.
Societe d'Etudes de Machines Speciales: *See*—
Corse, Louis G., 3,904,142.
Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See*—
Thominet, Michel Leon, 3,904,622.
Societe d'Exploitation des Brevets Granofibre Sebreg: *See*—
Jacquelin, Guy; and Fournet, Jean, 3,904,726.
Societe Entrepose G.T.M. pour les Travaux Petroliers Maritimes, E.T.P.M.: *See*—
Minkiewicz, Edmond Andre, 3,904,845.
Societe Generale de Fonderie: *See*—
Primault, Andre, 3,904,128.
Societe Internationale de Vente pour l'Automobile et le Cycle: *See*—
Darras, Jean, 3,903,980.
Societe Lannionnaise d'Electronique: *See*—
Lavanant, Pierre; and Jacob, Jean-Baptiste, 3,905,030.
Societe Nouvelle de Roulements: *See*—
Sonnerat, Claude, 3,904,008.
Societe Suisse pour l'Industrie Horlogere Management: *See*—
Burki, Hughes, 3,903,686.
Soehne, Friedrich Maurer: *See*—
Bertschmann, Silvio, 3,904,302.
Soehngen, John W.: *See*—
Vogt, Clifford M.; Soehngen, John W.; and Polise, Joseph C., 3,904,798.
Sokolov, Leonid Pavlovich: *See*—
Afanasiev, Alexandr Dmitrievich; Lykov, Alexei Gavrilovich; Mogilevsky, Alexandr Moiseevich; Sokolov, Leonid Pavlovich; Fridman, Evl Gershkovich; and Dergachev, Fedor Matveevich, 3,904,729.
Sola, Alberto, to Fiat Societa per Azioni. Fuel injection plant for internal combustion engines. 3,903,852, Cl. 123-32.0EA.
Solbern Corporation: *See*—
Eisenberg, Bernard C., 3,903,941.
Solomon, Gustave: *See*—
Royal, Douglas E.; Sevy, Jess L.; and Solomon, Gustave, 3,903,873.
Somepla S.A.: *See*—
Grussen, Jean, 3,904,062.
Sometani, Taro: *See*—
Hisada, Souichi; and Sometani, Taro, 3,903,850.
Somlo, Tibor, to Ciba-Geigy Corporation. Process for the manufacture of tetrasubstituted ureas. 3,904,602, Cl. 260-239.00E.
Sommer, Erwin: *See*—
Van Winsen, Friedrich H.; Sorsche, Joachim H.; and Sommer, Erwin, 3,903,982.
Sommer, Peter J., to American Gage & Machine Company. Grinding machine with resilient control wheel. 3,903,655, Cl. 51-103.00R.
Sonenberg, Martin; and Yamasaki, Nobuyuki, to Research Corporation. Clinically active bovine growth hormone fraction. 3,904,753, Cl. 424-177.000.
Song, Ching-Long: *See*—
Wintz, Paul A.; Sergo, John R., Jr.; and Song, Ching-Long, 3,905,028.
Sonnerat, Claude, to Societe Nouvelle de Roulements. Clutch release bearing having resilient centering and silencing means. 3,904,008, Cl. 192-98.000.
Sonnet, Philip E.: *See*—
Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, 3,904,773.
Sonoda, Takeshi: *See*—
Takayanagi, Kazuo; and Sonoda, Takeshi, 3,904,608.
Sony Corporation: *See*—
Okada, Hisao; and Murakami, Shigetoshi, 3,904,967.
Suzuki, Tadao, 3,904,979.
Sorenson, Charles E.; Reynolds, James E.; and DeBaillie, Arnold A., to Hahn, Inc. Dead man's control for lawn mower. 3,903,679, Cl. 56-11.600.
Sorsche, Joachim H.: *See*—
Van Winsen, Friedrich H.; Sorsche, Joachim H.; and Sommer, Erwin, 3,903,982.
Soto, Manuel A.: *See*—
Brewer, Robert O.; and Soto, Manuel A., 3,904,935.
Southwire Company: *See*—
Bass, Joseph A.; McKenzie, Lewis A.; and Powers, Frank M., 3,904,180.
Richardson, Billy Joe, 3,903,954.
Space Sciences, Inc.: *See*—
Aisenberg, Sol, 3,904,505.
Spaeth, Werner: *See*—
Wenzig, Wolfgang; and Spaeth, Werner, 3,903,591.
Spann, Donald C. Device for supporting a limb and associated extremity. 3,903,878, Cl. 128-77.000.
Spears, Jess W.: *See*—
Gilles, John R.; McFarland, William F.; and Spears, Jess W., 3,904,027.
Specker, Robert A., to Union Carbide Corporation. Separator for zinc chloride cells. 3,904,437, Cl. 136-103.000.
Speirs, Kenneth K.; Hoy, William M.; and Bradley, Robert, to Chromalloy American Corporation. Masking method for use in aluminizing selected portions of metal substrates. 3,904,789, Cl. 427-253.000.
Spencer, Gordon R., to Raytheon Company. Focusing means for cathode ray tubes. 3,904,913, Cl. 313-449.000.
Sperry Rand Corporation: *See*—
Lipo, James L.; and Mahoney, Ralph W., 3,904,014.
Sperry Rand Limited: *See*—
Walters, Ronald Bernard, 3,903,786.
Spiridonov, Viktor Vasilievich. Pipeline anchoring arrangement. 3,903,704, Cl. 61-46.000.
Sports Products Corporation: *See*—
Dickstein, George, 3,904,469.
Spruyt, Harry: *See*—
Hoffman, Louis S.; and Spruyt, Harry, 3,903,641.
Hoffman, Louis S.; and Spruyt, Harry, 3,904,074.
Squiers, John C., to United States of America, Army. Shell construction sealing washer. 3,903,802, Cl. 102-38.000.
Srail, Raymond C., to B. F. Goodrich Company, The. Method of making curved resilient laminates. 3,904,467, Cl. 156-229.000.
Srubar, Jiri: *See*—
Hau, Antonin; Frydrych, Jiri; and Srubar, Jiri, 3,903,757.
Stache, Ulrich; Fritsch, Werner; Haede, Werner; Radscheit, Kurt; and Lindner, Ernst, to Hoechst Aktiengesellschaft. Cardenolide-3-[2'-desoxy-glycosides] and process for their manufacture. 3,904,599, Cl. 260-210.500.
Stachowiak, Aribert: *See*—
Christgau, Hermann; Schubert, Wolfgang; and Stachowiak, Aribert, 3,904,532.
Stage, Jack W. Constant velocity universal joint. 3,903,711, Cl. 64-21.000.
Stal Refrigeration AB: *See*—
Axelsson, Rolf, 3,904,322.
Standard Oil Company, The: *See*—
Adams, Robert J., 3,904,115.
Milberger, Ernest C.; and Dolhyj, Serge R., 3,904,653.
Standard Oil Company (Indiana): *See*—
Frank, Marshall E., 3,904,652.
Stanford Research Institute: *See*—
Hill, John W.; and Sword, Antony J., 3,904,234.
Stanislaw, Peter, to Morrison Machine Co. Hot oil drum. 3,903,961, Cl. 165-89.000.
Stanley Works, The: *See*—
Suska, Charles R., 3,903,567.
Staples, Barry Edward Vosper: *See*—
Wheeler, Frederick Charles; and Staples, Barry Edward Vosper, 3,904,164.
Statni vyzkumny ustav textilni: *See*—
Horeni, Bohumir; Zid, Vladimir; Neckar, Bohuslav; and Prochazka, Jan, 3,903,714.
Stauffer Chemical Company: *See*—
Jin, Jung Il, 3,904,570.
Stauffer, Norman L., to Honeywell Inc. Focus detecting apparatus. 3,904,869, Cl. 250-204.000.
Stauffer, Norman L., to Honeywell Inc. Focus detecting apparatus. 3,904,870, Cl. 250-204.000.
Ste. d'Application Plastique Mecanique et Electronique Plastimecanique: *See*—
Lechevallier, Raymond, 3,904,345.
Stearns, C. Wayne: *See*—
Hecht, Victor, 3,903,858.
Stearns, Richard I. Resealing device for a container. 3,904,071, Cl. 220-233.000.
Stegmeier, William J. Apparatus for and method of equipping swimming pools and the like with a tile band and cantilever deck. 3,904,717, Cl. 264-34.000.
Stein, Klaus: *See*—
Richter, Gerhard; and Stein, Klaus, 3,903,712.
Stein, Seymour, to Bendix Corporation, The. Apparatus for extracting circuit cards from chassis. 3,903,576, Cl. 29-203.00H.
Steinberger, Siegfried; Nagel, Erich; Biedermann, Ernst; Pflugbeil, Mathias; Dreher, Karl; and Fleck, Adolf, to Agfa-Gevaert Aktiengesellschaft. Apparatus for stepwise transport of webs in photographic copying machines or the like. 3,904,145, Cl. 242-75.200.
Steinmann, Gerd: *See*—
Huber, Josef; and Steinmann, Gerd, 3,904,860.
Steinwart, Johannes, to Audi NSU Auto Union Aktiengesellschaft; and Wankel GmbH. Rotary piston combustion engine of trochoid type. 3,904,329, Cl. 418-99.000.
Stenicka, Alan R.: *See*—
Barrett, David M.; and Stenicka, Alan R., 3,904,531.
Sterling Drug Inc.: *See*—
Minatoya, Hiroaki; Tullar, Benjamin F.; and Conway, Walter D., 3,904,671.
Sterner, Melvin F.: *See*—
Aquino, Charles F.; and Sterner, Melvin F., 3,903,859.
Stevens Supply Company: *See*—
Polinski, James E., 3,903,866.
Stewart, Alan, to International Standard Electric Corporation. Two-wire, bi-directional voice frequency repeater. 3,904,838, Cl. 179-170.00R.
Stinehelfer, Harold Eugene, Sr., to Microwave Associates, Inc. Trapped-radiation microwave transmission line. 3,904,997, Cl. 333-84.00M.

Stinson, Robert J. Cut-off attachment for a power hand saw. 3,903,774, Cl. 83-471.200.

Stjernstrom, Nils-Erik: *See—*
Carnmalm, Bernt Sigfrid Emanuel; de Paulis, Tomas; Ross, Svante Bertil; Ramsby, Sten Ingvar; Stjernstrom, Nils-Erik; and Ogren, Sven-Ove, 3,904,691.

Stoeckelmann, Ulrich W., to Weatherhead Company, The. Pressure balancing system for gear pumps or motors. 3,904,333, Cl. 418-132.000.

Stopka, Karel. Method and apparatus for purification. 3,904,521, Cl. 210-44.000.

Stork Amsterdam N.V.: *See—*
Vertegaal, Jacobus Gerardus, 3,903,792.

Straka, Emil R., to Varian Associates. Mosaic light valve and method of fabricating same. 3,904,272, Cl. 350-150.000.

Straumanis, Maris, to Industrial Nucleonics Corporation. System and method for controlling a machine continuously feeding a sheet to intermittently activated station. 3,904,338, Cl. 425-145.000.

Stromberg-Carlson Corporation: *See—*
Pommerening, Uwe A.; and Richards, Glenn L., 3,904,831.

Styner & Bienz AG: *See—*
Glaus, Heinrich, 3,904,472.

Sugimoto, Keiichi; Kobayashi, Kunio; Nishijima, Koji; and Morimoto, Shiro, to Takeda Chemical Industries, Ltd. Cephalosporins. 3,904,616, Cl. 260-243.00C.

Sugimoto, Toshitaka; Takami, Norihiko; and Hattori, Osamu, to Hitachi, Ltd. Magnetic pickup cartridge. 3,904,837, Cl. 179-100.41K.

Suh, John T.; and Schnettler, Richard A., to Colgate-Palmolive Company. L-3-hydroxymethyltyrosine and salts thereof. 3,904,680, Cl. 260-519.000.

Suits, James Carr, to International Business Machines Corporation. Rhodium and ruthenium compositions. 3,904,404, Cl. 75-172.00R.

Sullivan, Douglas C.; Ross, Edward C.; and Saelid, Per O., to Boeing Company, The. High temperature lubricant. 3,904,443, Cl. 148-6.15R.

Sullivan, John A.: *See—*
Robinson, C. Paul; Jensen, Reed J.; Davis, William C.; and Sullivan, John A., 3,904,985.

Sumitomo Chemical Company, Limited: *See—*
Morimoto, Masayoshi; Sanjiki, Tetsutaro; Horiike, Hideki; and Furuta, Motonobu, 3,904,709.
Sagawa, Seiji; Kunihiro, Haruo; Kimura, Osamu; and Inoue, Masatoshi, 3,904,638.

Sumitomo Shipbuilding & Machinery Co., Ltd.: *See—*
Kurihara, Yasuo; and Kondo, Masaki, 3,904,483.

Summagraphics Corporation: *See—*
Whetstone, Albert L.; and Brenner, Alfred E., 3,904,821.

Sun Chemical Corporation: *See—*
Horwitt, Laurence G.; and Mattis, Donald J., 3,904,848.

Sun Oil Company of Pennsylvania: *See—*
Mills, Ivor W., 3,904,507.
Shawhan, Elbert N., 3,904,970.

Sun Ventures, Inc.: *See—*
Mitchell, Richard E., 3,904,702.

Sunbeam Corporation: *See—*
Augustine, Robert John, 3,903,625.
Hemrich, William R.; and Gallanis, George P., 3,903,904.
Scott, William H.; and Szymczak, Eugene B., 3,904,178.

Sunds Aktiebolag: *See—*
Bohlmark, Arne Sven, 3,904,020.

Sundstrand Corporation: *See—*
Readman, John, 3,903,924.

Sung, Chin Peng, to Board of the Rubber Research Institute of Malaysia, The. Method of treating synthetic polymer latex of styrenebutadiene or polyisoprene to make solid polymer derived therefrom redispersible to a latex. 3,904,567, Cl. 260-23.70R.

Sunkist Growers, Inc.: *See—*
Paddock, Paul F.; and Cramer, Jerry W., 3,904,023.

Suntory Ltd.: *See—*
Yamamoto, Ryo; Yamamoto, Izuru; and Yoshizawa, Takumi, 3,904,780.

Superior Continental Corporation: *See—*
Beene, Gerald Wayne, 3,904,833.

Superior Electric Company, The: *See—*
Rosshirt, Hermann, 3,904,858.

Suska, Charles R., to Stanley Works, The. Two knuckle hinges. 3,903,567, Cl. 16-189.000.

Sussman, Eugene Donald: *See—*
Vrabel, Joseph D.; Gosselin, Dennis W.; Sussman, Eugene Donald; and Ofsevit, David S., 3,905,012.

Suzue, Seisuke: *See—*
Satokawa, Takaomi; Fujii, Tuneo; Honda, Norimasa; Asano, Kozo; Nakamura, Yukiharu; and Suzue, Seisuke, 3,904,575.

Suzuki, Isao: *See—*
Ishii, Takimi; Suzuki, Isao; and Nagai, Torao, 3,904,991.

Suzuki, Minoru, to Ricoh Co., Ltd. Device for clamping the trailing end portion of a sheet. 3,903,795, Cl. 101-409.000.

Suzuki Motor Company Limited: *See—*
Shigeru, Ishimori; and Shinjiro, Otsuka, 3,904,490.

Suzuki, Mutuo: *See—*
Moriguti, Kazuo; Yamaguchi, Yukio; and Suzuki, Mutuo, 3,904,311.

Suzuki, Shigekazu; Shibata, Masaharu; and Kishi, Hirotake, to NHK Spring Co., Ltd. Grinding machine. 3,903,651, Cl. 51-5.00D.

Suzuki, Shigeyuki; Kaneda, Isamu; Endo, Hiroshi; Miyata, Kazuo; Horiguchi, Tadao; and Yamamoto, Kazumasa, to Kureha Kagaku Kogyo K.K.; and Kurita Water Industries Ltd. Method for production of cationic surfactant. 3,904,687, Cl. 260-564.00E.

Suzuki, Shoji, to Alps Motorola Inc. Cassette loading apparatus for use in cassette tape recorder. 3,904,149, Cl. 242-198.000.

Suzuki, Tadao, to Sony Corporation. Protective circuit for transistor amplifier. 3,904,979, Cl. 330-207.00P.

Suzuki, Takatoshi: *See—*
Komatsu, Noboru; Suzuki, Takatoshi; Yamamoto, Nobuyuki; and Tsuzuki, Yukikazu, 3,904,403.

Swain, Stephen C.: *See—*
Richardson, James E.; and Swain, Stephen C., 3,904,075.

Swanson, Harold V.; and Bald, Robert E., to Interpace Corporation. Corrosion protective band for underground pipe joints with metal parts. 3,904,213, Cl. 277-229.000.

Swartz, Delbert D.: *See—*
McRoskey, John W.; and Swartz, Delbert D., 3,904,087.

Swatman, Donald R., to Den-Tal-Ez Mgf., Co. Handpiece holder including automatically releasable power lockout means. 3,904,841, Cl. 200-61.58R.

Sweeney, Gerald T., to Tigre Tierra, Inc. Drilling apparatus with down-the-hole motor. 3,903,975, Cl. 175-246.000.

Sweeney, Theodore J.; and Ettinger, Donald H., to USM Corporation. Multiple segment fastener and method. 3,903,582, Cl. 29-411.000.

Sweeney, William M., to Texaco Inc. Polyacrylates and waxy residual fuel compositions thereof. 3,904,385, Cl. 44-62.000.

Sweet, Ervin J., to Avco Corporation. Smoke sampling apparatus. 3,903,727, Cl. 73-28.000.

Swered, Paul; and Shema, Bernard F., to Betz Laboratories, Inc. Slimicidal compositions containing bis (trichloromethyl) sulfone and their use. 3,904,764, Cl. 424-298.000.

Swift & Company: *See—*
Donnelly, Thomas H.; and McGinnis, Robert S., 3,904,771.

Swift, John A.: *See—*
Swift, June H.; and Swift, John A., 3,903,644.

Swift, June H.; and Swift, John A. Self-watering planter and method of making same. 3,903,644, Cl. 47-38.000.

Sword, Antony J.: *See—*
Hill, John W.; and Sword, Antony J., 3,904,234.

Sword, Geoffrey; Lawrence, John Leslie; Raggett, Stephen Richard; and Blakemore, Bernard, to Colourvision Associates. High voltage supply circuits. 3,904,819, Cl. 178-7.50R.

Sykes, James M.: *See—*
Anderson, Richard M.; and Sykes, James M., 3,903,709.

Sykes Pumps Limited: *See—*
Paish, Harold Philip Sidney; and Smith, Henry, 3,904,319.

Sykes, William Fillans; Weeden, Anthony Joseph; and Cleare, Ian Martin, to Smiths Industries Limited. Vehicle exhaust tubing. 3,903,928, Cl. 138-109.000.

Sylvester, Amedeo A.: *See—*
Diamond, John A.; Sylvester, Amedeo A.; and Carver, Fred F., 3,903,614.

Syntex Corporation: *See—*
Day, John T.; Waugh, Richard; Lorz, Emil; and Lyle, Dennis W., 3,904,683.
Edwards, John J., 3,904,611.
Fried, John H.; and Harrison, Ian T., 3,904,682.

Syntex (U.S.A.) Inc.: *See—*
Pfister, Jurg R.; Harrison, Ian T.; and Fried, John H., 3,904,647.

Szczepanski, Harry. Machine for reconditioning coated spray masks. 3,904,526, Cl. 210-196.000.

Szevernyi, Nikolaus A.; and Bickmire, Walter W., to GTE Sylvania Incorporated. Sensor device and method for making. 3,905,004, Cl. 337-104.000.

Szydlowski, Joseph. Method and devices for avoiding the formation of thermal imbalances in turbine engines. 3,903,691, Cl. 60-39.660.

Szymczak, Eugene B.: *See—*
Scott, William H.; and Szymczak, Eugene B., 3,904,178.

Tabaczynski, Rodney J., to General Motors Corporation. Two-stage rotary combustion engine. 3,903,848, Cl. 123-8.130.

Tabara, Yoshijiro; Akiyama, Hiroshi; Igawa, Masayuki; Maekawa, Tadashi; and Shinomiya, Tokuo, to Mitsubishi Rayon Co., Ltd. Polyolefin micro-flake aggregation useful for manufacturing synthetic papers and polyolefin synthetic papers obtainable therewith. 3,904,804, Cl. 428-332.000.

Tabor, Robert G. Dimedone derivatives of dialdehydes. 3,904,693, Cl. 260-586.00R.

Tada Kogyo Ltd.: *See—*
Shimizu, Shigeki; Shinoda, Wataru; Makino, Hazime; Kondo, Hiroyuki; and Okikawa, Katuaki, 3,904,421.

Tadera, Yoshihiro: *See—*
Hayashi, Kunihisa; and Tadera, Yoshihiro, 3,903,654.

Taft Broadcasting Corporation: *See—*
Covington, Morris T., 3,903,729.

Tagami, Kiyoshi: *See—*
Shichida, Hiromichi; Tagami, Kiyoshi; and Toyoda, Kenichi, 3,904,897.

Tahara, Tetsuya: *See—*
Nakanishi, Michio; Tahara, Tetsuya; Araki, Kazuhiko; and Shiroki, Masami, 3,904,641.

Taiga Industries, Inc.: *See—*
Bremer, Allen R., 3,904,340.

Taitel, Charles M.; and Ryan, Ralph L., to Compensating Tension Controls, Inc. Spring system assembly for tension compensating control device. 3,904,147, Cl. 242-156.200.

Takada, Toshihisa; and Matsui, Yukio, to Fujikura Cable Works, Limited, The. Method of forming an air tight dam for communication cables. 3,903,595, Cl. 29-628.000.

Takagi, Yoshiko, to Opti Holding AG. Slide fastener. 3,903,572, Cl. 24-205.13D.

Takahashi, Noboru; Chiba, Koji; Nakamura, Mutsuaki; Ozaki, Sadao; Isono, Hiromasa; Naruse, Tunehide; Mishihara, Toshikazu; and Fukushima, Iwao, to Victor Company of Japan, Limited. Method for preparing magnetic alloy powder by surface nitriding. 3,904,448, Cl. 148-105.000.

Takahashi, Susumu. Atmosphere isolating means in a continuous-type furnace. 3,904,355, Cl. 432-152.000.

Takahashi, Toru, to Canon Kabushiki Kaisha. Electrophotographic process of transfering colored electrostatic images. 3,904,406, Cl. 96-1.400.

Takahashi, Toru: *See—*
Hanada, Hiroshi; and Takahashi, Toru, 3,904,409.

Takahashi, Tsuneo: *See—*
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Takami, Norihiko: *See—*
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Takasu, Isamu, to Toyo Glass Machinery Co., Ltd. Speed reduction mechanism. 3,903,750, Cl. 74-63.000.

Takayanagi, Kazuo; and Sonoda, Takeshi, to Toray Industries, Inc. Process for the production of lactam. 3,904,608, Cl. 260-239.30A.

Takeda Chemical Industries, Ltd.: *See—*
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Takenaga, Mitsuhiro; and Okada, Akira, to Meiji Seika Kaisha, Ltd. Antibiotic solution. 3,904,755, Cl. 424-181.000.

Takes, Erick Willem Johan: *See—*
Theyse, Frederik Herman; Janssen, John Louis Joseph Marie; and Takes, Erick Willem Johan, 3,904,001.

Takeyama, Kenichi; Morimoto, Takayoshi; and Konishi, Fumiya, to Matsushita Electric Industrial Co., Ltd. Burning and collection apparatus for combustion gases. 3,904,368, Cl. 23-230.0PC.

Takiguchi, Koichi, to Fuji Xerox Co., Ltd. Process for fixing images by contact heating in a duplicator. 3,904,786, Cl. 427-194.000.

Taliani, Laurent: *See—*
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Tamura, Katunori: *See—*
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Tanabe Seiyaku Co., Ltd.: *See—*
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Tanaka, Tadashi: *See—*
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Tanaka, Yoshio; Kato, Masao; Okada, Akira; and Shimura, Yukio, to Director-General of the Agency of Industrial Science & Technology. Process for the production of polymers capable of self-curing at room temperature and products thereof. 3,904,587, Cl. 260-77.5BB.

Taniguchi, Takuzo: *See—*
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,904,639.

Tannaka, Yasuaki, to Hitachi, Ltd. Acoustic lens. 3,903,990, Cl. 181-176.000.

Tanzer, Johann. Rudder assembly. 3,903,830, Cl. 114-162.000.

Tao, Frank: *See—*
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Tashima, Junichiro, to Tokyo Shibaura Electric Co., Ltd. Spring spacer device for resiliently supporting nuclear fuel rods. 3,904,475, Cl. 176-78.000.

Tassicker, Owen James: *See—*
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Tatch, Martin S.: *See—*
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Tate, George W., Jr., to Clegg, Giles C., Jr.; and Lynn, John R. Method and apparatus for determining the distance between the surface of an eye and a reference point. 3,904,280, Cl. 351-1.000.

Taudt, Heinz; and Keller, Hans, to Dr. Ing. Rudolf Hell. Method for the dot-by-dot and line-by-line reproduction of picture originals. 3,904,816, Cl. 178-6.000.

Tavernier, Bernard Hippoliet: *See—*
Serrien, Frans Philomena; Tavernier, Bernard Hippoliet; Pollet, Robert Joseph; and Sels, Francis Jeanne, 3,904,412.

Taya, Miguel Margarit: *See—*
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Taylor, Roland S., to General Motors Corporation. Carburetor fuel bowl vent. 3,904,712, Cl. 261-34.00A.

Teasdale, Thomas S.; and Altamira, Anthony Francis, to Texaco Inc. Tertiary recovery operation. 3,903,966, Cl. 166-245.000.

Tech Development Inc.: *See—*
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Technicon Instruments Corporation: *See—*
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Tecotzky, Melvin: *See—*
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Bowman, Earl K.; and Teele, John C., 3,903,678.

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Tele Speed Communications, Inc.: *See—*
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Telecommunications Radioelectriques et Telephoniques T.R.T.: *See—*
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Teledyne Mid-America Corporation: *See—*
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Telefonaktiebolaget LM Ericsson: *See—*
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Teletype Corporation: *See—*
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Tenneco Inc.: *See—*
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Terada, Masaaki, to Olympus Optical Co., Ltd. Endoscope. 3,903,877, Cl. 128-6.000.

Teraji, Tsutomu: *See—*
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Ter Haar, Leonard W., to Shell Oil Company. Process for the production of a high methane content town gas. 3,904,388, Cl. 48-212.000.

Teroson Werke: *See—*
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Terrell, Ross C., to Airco, Inc. 1-Bromo-2,2,2-trifluoroethyl difluoromethyl ether. 3,904,697, Cl. 260-614.00F.

Tessler, Martin M.; Jarowenko, Wadym; and Amitrano, Richard A., to National Starch and Chemical Corporation. Hydroxypropylated, inhibited high amylose retort starches. 3,904,601, Cl. 260-233.30R.

Texaco Inc.: *See—*
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Teasdale, Thomas S.; and Altamira, Anthony Francis, 3,903,966.
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Texas Instruments Incorporated: *See—*
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Cochran, Michael J.; and Grant, Charles P., Jr., 3,904,863.
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Thau, Lawrence W., Jr.; and Coughlan, Edward E., Jr., to Victaulic Company of America. Roll grooving tool. 3,903,722, Cl. 72-105.000.

Therachemie Chemisch-Therapeutische Gesellschaft mbH: *See—*
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Theyse, Frederik Herman; Janssen, John Louis Joseph Marie; and Takes, Erick Willem Johan, to Reactor Centrum Nederland. Vibration damper with a hermetically closed damping chamber. 3,904,001, Cl. 188-266.000.

Thibault, Jacques Gabriel Auguste. Machine for loading packages on a pallet. 3,904,045, Cl. 214-6.0BA.

Thim, Stig Helge Gunnar; and Borup, Lennart A., to A-Betong AB. Railbed. 3,904,112, Cl. 238-84.000.

Thomas, Clarence A. Compact golf course. 3,904,209, Cl. 273-176.00A.

Thomas Machinery Corporation: *See—*
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Thomas, William J.: *See—*
Bego, Robert E.; Thomas, William J.; and Voltattorni, Anthony J., 3,903,952.

Thominet, Michel Leon, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. Dialkylaminoalkyl ethers of 2-alkoxy-3,5-dihalobenzene. 3,904,622, Cl. 260-247.70S.

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Thorn Electrical Industries Limited: *See—*
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Wolfe, Kenneth Roy; and Clarke, Maurice George, 3,904,908.
Thunberg, Jon C.; Bragdon, Robert W.; and Moore, William P., to W. R. Grace & Co. Process for recovering glycine and beta-alanine from sodium sulfate solutions. 3,904,585, Cl. 260-534.00R.
Thunberg, Jon C.: *See—*
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Thurnauer, Hans; and Coubrough, Lawrence E., to Coors Porcelain Company. Assembly and method for supporting ceramics and the like during firing. 3,904,352, Cl. 432-5.000.
TIE/Communications, Inc.: *See—*
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Tigre Tierra, Inc.: *See—*
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Tipping, James William; and Whim, Bernard Patrick, to Imperial Chemical Industries Limited. Cleaning process using a non-azeotrope forming contaminated cleaning mixture. 3,904,430, Cl. 134-11.000.
Tison, Kenneth F.; and Tremoulet, Olivier L., Jr., to Marine Construction & Design Co. Long line hauling and reel storage system. 3,903,632, Cl. 43-6.500.
Tobe, Martin Leslie; Khokhar, Abdul Rauf; and Braddock, Peter David Michael, to Rustenburg Platinum Mines Limited. Compositions containing platinum. 3,904,663, Cl. 260-429.00R.
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Toray Industries, Inc.: *See—*
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Torr, David, deceased, to First National Bank of Nevada, Executor of the Estate of David Torr. Disposable liquid absorbent products. 3,903,889, Cl. 128-287.000.
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Touch, Joseph; and Touch, Dianne Ellen. Electric water faucet. 3,904,167, Cl. 251-14.000.
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Underwood, Gene E. Multiple density separator. 3,904,109, Cl. 233-2.000.
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Dimigen, Heinz; and Convertini, Ursula, 3,904,462.
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United States Steel Corporation: *See*—
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Arnold, Robert J.; and Gattuso, Marion J., 3,904,686.
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Urban, Peter, 3,904,743.
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Bancalari, Eduardo H., 3,903,869.
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Lief, Florence S., 3,904,750.
Uota, Kousaku, to Mitsubishi Denki Kabushiki Kaisha. Seat belt operation detector. 3,904,884, Cl. 307-10.0SB.
UPD Industries, Inc.: *See*—
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Bundy, Gordon L., 3,904,679.
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Urban, Peter, to Universal Oil Products Company. Continuous process for scrubbing SO_2 from a gas stream and making sulfur. 3,904,743, Cl. 423-567.000.
Uskert nee Dievald, Emilia: *See*—
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USM Corporation: *See*—
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van den Ouweland, Godefridus Antonius Maria; and Peer, Henricus Gerardus, to Lever Brothers Company. Process for the preparation of a flavor substance by reacting a 4-oxy-5-alkyl-3-furanone with a hydrogen sulfide liberating substance. 3,904,655, Cl. 260-347.800.
van der Lely, Cornelius. Trailers. 3,904,054, Cl. 214-317.000.
Van Doorn, Petrus J. J.; Van Gestel, Antonius J. J.; and Deen, Peter J., to Shell Oil Company. Heat exchanger for cooling hot gases. 3,903,964, Cl. 165-158.000.
Van Gestel, Antonius J. J.: *See*—
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VanIngen, Jack A.; Maddocks, Roger H.; and Carter, Arthur L., to Eastman Kodak Company. Method of and apparatus for debubbling liquids. 3,904,392, Cl. 55-15.000.
Van Meter, Michael D.: *See*—
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van Remmen, Hendrikus Hermanus Johannes, to Instituut Voor Bewaring en Verwerking Van Landbouwprodukten. Device for washing potato cuttings. 3,903,910, Cl. 134-60.000.
Van Rens, Russell J., to Outboard Marine Corporation. Lubricating system for rotary internal combustion engine. 3,904,330, Cl. 418-100.000.
Van Santen, Aart; and Elofsson, Kjell, to Allmanna Svenska Elektriska Aktiebolaget. Device for refueling a nuclear reactor having a core comprising a plurality of fuel assemblies. 3,904,048, Cl. 214-27.000.
Van Scott, Eugene J.; and Yu, Ruey J. Treatment of psoriasis. 3,904,766, Cl. 424-325.000.
Van Straaten, Jan, to U.S. Philips Corporation. Circuit arrangement for generating a control signal for the field output stage in a television receiver. 3,904,823, Cl. 178-69.5TV.
Van Winsen, Friedrich H.; Sorsche, Joachim H.; and Sommer, Erwin, to Daimler-Benz Aktiengesellschaft. Drive shaft for vehicles, especially for motor vehicles. 3,903,982, Cl. 180-70.00R.
Varian Associates: *See*—
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Verrips, Cornelis Theodorus; and Vonkeman, Hendrik, to Lever Brothers Company. Preparing margarine containing viable bacterial cells having alcohol-dehydrogenase activity. 3,904,767, Cl. 426-33.000.

Vertegaal, Jacobus Gerardus, to Stork Amsterdam N.V. Rotary screen printer auxiliary conveyor drive to eliminate creep. 3,903,792, Cl. 101-118.000.

Vesamaa, Erkki, to Oy, Valmet. Firing mechanism in a firearm. 3,903,631, Cl. 42-70.00R.

Vest, Eugene W., to Texaco Inc. Vapor seal for fuel tank filler tube. 3,903,942, Cl. 141-301.000.

Vestergaard, Andres. Cooking apparatus. 3,903,867, Cl. 126-38.000.

Vetco Offshore Industries, Inc.: *See—*
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Vida, Julius A.; and Samour, Carlos M., to Kendall Company, The. 1-Methyl-3-alkoxymethyl-5,5-disubstituted barbituric acid compounds. 3,904,627, Cl. 260-257.000.

Vielmo, Oskar: *See—*
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Vieri, Bruno J., to Xerox Corporation. Dynamic linearizer for electromagnetically driven moving coil devices. 3,904,961, Cl. 324-125.000.

Vierou, William F.: *See—*
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Virginio Rimoldi & C. S.p.A.: *See—*
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Virr, Michael John: *See—*
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Visual Graphics Corporation: *See—*
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Vivien, Jean: *See—*
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Vizy, Adam J., to Henry Mann, Inc. Collapsible forming die. 3,903,934, Cl. 140-105.000.

Vogel, Ralph A.: *See—*
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Vogt, Clifford M.; Soehngen, John W.; and Polise, Joseph C., to Celanese Corporation. Varying density cartridge filters. 3,904,798, Cl. 428-36.000.

Volkswagenwerk Aktiengesellschaft: *See—*
Husmann, Horst, 3,904,005.
Maneck, Ernst, 3,903,648.

Voltattorni, Anthony J.: *See—*
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Vonkeman, Hendrik: *See—*
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Vorozhtsov, Georgy Nikolaevich: *See—*
Dokunikhin, Nikolai Stepanovich; Vorozhtsov, Georgy Nikolaevich; and Sarycheva, Valentina Petrovna, 3,904,650.

Vorrhees, John E.; and Shockman, Robert L., to Minster Machine Company, The. Hydrostatic bearing arrangement for press slide. 3,903,993, Cl. 184-5.000.

Vorwerk & Co. Elektrowerke KG: *See—*
Richter, Gerhard; and Stein, Klaus, 3,903,712.

Vrabel, Joseph D.; Gosselin, Dennis W.; Sussman, Eugene Donald; and Ofsevit, David S., to United States of America, Transportation. Dynamic railroad freight car monitoring system. 3,905,012, Cl. 340-48.000.

Vyzkumny a vyvojovy ustav Zavodu vseobecneho strojirenstri: *See—*
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W. F. Hall Printing Company: *See—*
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W. L. Green & Co., Inc.: *See—*
Green, William Lawrence, 3,903,828.

W. R. Grace & Co.: *See—*
Gaudette, Roger R.; Philbrook, James E.; and Thunberg, Jon C., 3,904,668.
Guthrie, James Leverette; and Huffman, Lenore J., 3,904,557.
Lundsager, Christian Bent; and Sergeys, Francis John, 3,904,551.
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WABCO Westinghouse: *See—*
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Wadsworth, Francis T.: *See—*
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Wadsworth, Melvin Eugene, to Combustion Engineering, Inc. Hot top liner unit with flexible plastic envelope. 3,904,166, Cl. 249-197.000.

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Waggoner, Marion Glen, to du Pont de Nemours, E. I., and Company. Composite films of glassine-polyolefin copolymer resins exhibiting high oxygen barrier characteristics. 3,904,806, Cl. 428-511.000.

Wagner Electric Corporation: *See—*
Daffron, Vernon M., 3,904,812.
Smith, Arthur H., 3,903,986.

Wakabayashi, Nobel: *See—*
Schwarz, Meyer; Sonnet, Philip E.; and Wakabayashi, Nobel, 3,904,773.

Waldo, Russell W., to Ideal Security Hardware Corporation. Sliding door lock. 3,904,229, Cl. 292-29.000.

Waldron, John W.; and Harvey, James E., III, to Estey Dynamics Corporation. Automatic powder spray apparatus and method for spraying the inside surfaces of containers. 3,904,930, Cl. 317-3.000.

Waletzko, Alfred. Backflow preventer valve. 3,903,916, Cl. 137-312.000.

Walker, David John: *See—*
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Walker, Richard E. Method of blasting. 3,903,799, Cl. 102-23.000.

Walker, Samuel C.: *See—*
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Walter Kidde Company Limited, The: *See—*
Topham-Clements, Hubert John, 3,903,914.

Walter, Richard Kupp, to RCA Corporation. Electronic component assembly. 3,905,000, Cl. 336-65.000.

Walters, Ronald Bernard, to Sperry Rand Limited. Hydraulic systems. 3,903,786, Cl. 91-444.000.

Wan, Chong T.: *See—*
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Wankel GmbH: *See—*
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Warner, Leadom A.; and Cleveland, Joseph J., to GTE Sylvania Incorporated. Apparatus for producing a bilayered green ceramic tape. 3,904,473, Cl. 156-470.000.

Warshawsky, Jay; and Lawall, Thomas R., to Fuller Company. Apparatus for preheating solid particulate material. 3,903,612, Cl. 34-168.000.

Wasco, Walter C.; Pierson, Charles W.; and Pagnard, Leonard E., to Eastman Kodak Company. Apparatus for ultrasonic splicing. 3,904,474, Cl. 156-581.000.

Wasielewski, Gerald E.: *See—*
Beltran, Adrian M.; Lindblad, Norman R.; and Wasielewski, Gerald E., 3,904,382.

Watanabe, Hikoitsu. Apparatus for driving drain pipes. 3,903,971, Cl. 173-37.000.

Watanabe, Hitoshi: *See—*
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,904,639.

Watanabe, Ichiro: *See—*
Murayama, Keisuke; Morimura, Syoji; Matsui, Katsuaki; Kurumada, Tomoyuki; Ohta, Noriyuki; and Watanabe, Ichiro, 3,904,581.

Watanabe, Isao: *See—*
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Watanabe, Masanori; and Nonomura, Kinzo, to Matsushita Electric Industrial Co., Inc. Luminous radiation panel apparatus. 3,904,905, Cl. 313-184.000.

Watanabe, Rii: *See—*
Boyden, Robert E.; and Watanabe, Rii, 3,904,015.

Watanabe, Tadashi: *See—*
Shingai, Kiyozo; Watanabe, Tadashi; Murata, Koichiro; and Isozaki, Osamu, 3,904,563.

Waterland Corporation: *See—*
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Watkins, Sidney C., to Avco Corporation. Air-fuel spray nozzle. 3,904,119, Cl. 239-405.000.

Watkins, William L., to MacMillan Bloedel Limited. Apparatus for felting wafers in waferboard production. 3,904,335, Cl. 425-80.000.

Watson, George A., to Celanese Corporation. Production of batting. 3,903,568, Cl. 19-163.000.

Watt, William: *See—*
Moreton, Roger; and Watt, William, 3,904,716.

Watts, John, to Boeing Company, The. Steerable and retractable aircraft nose landing gear assembly. 3,904,153, Cl. 244-50.000.

Watts, Ronald E.: *See—*
Anderson, George de W.; and Watts, Ronald E., 3,904,620.

Waugh, Richard: *See—*
Day, John T.; Waugh, Richard; Lorz, Emil; and Lyle, Dennis W., 3,904,683.

Wayne Electronic Products Co.: *See—*
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Weatherhead Company, The: *See—*
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Webasto-Werk W. Baier KG: *See—*
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Webb, Douglas E.; and Schroeder, Russell G., II, to Xerox Corporation. Lamp control and lamp switch circuit. 3,904,922, Cl. 315-151.000.

Weber, William: *See—*
Barton, Dan K.; and Weber, William, 3,903,837.

Webster, Ronald B., to Gerber Scientific Instrument Company, The. Photoexposure mechanism and contact printer therefor. 3,904,291, Cl. 355-19.000.

Weeden, Anthony Joseph: *See—*
Sykes, William Fillans; Weeden, Anthony Joseph; and Cleare, Ian Martin, 3,903,928.

Weigl, James, to Bourns, Inc. Respirator system and method. 3,903,881, Cl. 128-145.600.

Weinhandl, Franz: *See—*
Ruedi, Joseph; Vielmo, Oskar; and Weinhandl, Franz, 3,904,321.

Weinshenker, Ned M., to Alza Corporation. Process for producing substituted iodolactone. 3,904,649, Cl. 260-343.300.

Welch, Walter J., to GAF Corporation. Precoated diazotype photocopying materials. 3,904,414, Cl. 96-75.000.

Welker, Robert H. Pivot valve. 3,904,176, Cl. 251-339.000.

Welsch, Wolfgang, to Siemens Aktiengesellschaft. Light-sensitive target for vidicon picture tube. 3,904,911, Cl. 313-366.000.

Wenrich, Carl M.; and Ramachandran, Kalambur G., to Teledyne Mid-America Corporation. Work utility stop signal circuit. 3,904,890, Cl. 307-231.000.

Wenzig, Wolfgang; and Spaeth, Werner, to Siemens Aktiengesellschaft. Semiconductor arrangement. 3,903,591, Cl. 29-578.000.

West, Robert E.: *See—*
Burch, Charles A., and West, Robert E., 3,904,878.

Westbert, Johan Eric Hayden: *See—*
Gustafson, Karl Ake Sture; and Westbert, Johan Eric Hayden, 3,904,851.

Western Electric Company, Incorporated: *See—*
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Durr, Helmut E.; and Haller, Albert H., 3,903,940.
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Westinghouse Air Brake Company: *See—*
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Westinghouse Brake and Signal Co.: *See—*
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Westinghouse Electric Corporation: *See—*
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Colston, John R., 3,904,042.
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Weyerhaeuser Company: *See—*
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Wheatley, Carl Franklin, Jr.; and Shevchenko, Oleksij, to RCA Corporation. Voltage reduction circuit for deflection yoke. 3,904,927, Cl. 315-408.000.

Wheeler, Frederick Charles; and Staples, Barry Edward Vosper. Suction means for attaching articles to road vehicles. 3,904,164, Cl. 248-362.000.

Wheeling-Pittsburgh Steel Corporation: *See—*
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Whetstone, Albert L.; and Brenner, Alfred E., to Summagraphics Corporation. Position determination devices. 3,904,821, Cl. 178-19.000.

Whetstone, Clay N., to Pacific Magnetic Structures, Inc. Method of making laminated magnetic material. 3,903,586, Cl. 228-190.000.

Whim, Bernard Patrick: *See—*
Tipping, James William; and Whim, Bernard Patrick, 3,904,430.

Whitaker, Raymond; and Barker, Dennis William, to Rank Organisation Limited, The. Optical components. 3,904,276, Cl. 350-252.000.

White, Trevor Raymond, to Imperial Chemical Industries Limited. Thermally stabilized synthetic polyamides. 3,904,705, Cl. 260-857.0TW.

White-Westinghouse Corporation: *See—*
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Whiteside, Robert C., to Continental Can Company, Inc. Screw on lid. 3,904,072, Cl. 220-288.000.

Whyte, Thaddeus E., Jr.; and Wise, John J., to Mobil Oil Corporation. Production of gasoline. 3,904,508, Cl. 208-17.000.

Wick, Reyburn; and Green, Kenneth A., to United States of America, Army. Method for improving transparency of thermally damaged acrylic glazing. 3,904,732, Cl. 264-341.000.

Wickenberg, Chester H.: *See—*
Olofsson, Sigfrid M.; and Wickenberg, Chester H., 3,904,325.

Wickens, Charles F. Sheet material cutting machines. 3,903,772, Cl. 83-146.000.

Wilfert, Karl; Barenyi, Bela; Haselmann, Heinrich; Scholz, Hansjurgen; Backhaus, Hans-Gerd; and Brambilla, Luigi, to Daimler-Benz Aktiengesellschaft. Protective installation for covering windshield columns, roof frames and rear window columns on the inside of a vehicle. 3,904,223, Cl. 280-150.00B.

Wilfert, Karl: *See—*
Barenyi, Bela; Wilfert, Karl; and Renner, Hermann, 3,904,237.

Wilhart, Helmut: *See—*
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Wilhelm, Dieter: *See—*
Meinecke, Klaus; Wilhelm, Dieter; Coir, Leo; Tillack, Jurgen; Samulowitz, Helmut; and Gebhardt, Karl, 3,904,904.

Wilhelm, John Raymond. Water closets. 3,903,550, Cl. 4-34.000.

Wilhelm Kemper KG: *See—*
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Wilhelmsburger Maschinenfabrik Hinrichs & Sohn: *See—*
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Wilhelmson, Jack L.; and Grant, Douglas M., to Instrumentation Specialties Company. Chromatographic column. 3,904,527, Cl. 210-198.00C.

Williams, C. Alan: *See—*
Martin, Robert F.; MacDonald, Robert D.; and Williams, C. Alan, 3,904,829.

Williams, Roger G., to Upjohn Company, The. Process for preparing optically active 6-(α-amino-acetamido)penicillanic acids and 7-(α-aminoacetamido) cephalosporanic acids. 3,904,606, Cl. 260-239.100.

Willoughby, Paul G.: *See—*
Hermsen, Robert William; and Willoughby, Paul G., 3,903,988.

Wilmers, Gottlieb, to Audi NSU Auto Union Aktiengesellschaft; and Wankel G.m.b.H. Rotor for rotary combustion engine. 3,904,328, Cl. 418-61.00A.

Wilson, Allen. Pendulum timer. 3,903,684, Cl. 58-1.000.

Wilson, Charles D.: *See—*
Gillette, Roy A.; and Wilson, Charles D., 3,903,977.

Wilson, Donald C., to FMC Corporation. Method of and apparatus for assorting particles according to the physical characteristics thereof. 3,904,517, Cl. 209-441.000.

Wilson, Floyd Leroy. Arcuate, stamp down fasteners for sheet securement. 3,903,573, Cl. 24-73.00D.

Wilson, Gardner P., to Gould Inc. Slope error compensating apparatus for use with profile measuring equipment. 3,903,735, Cl. 73-105.000.

Wilson, Newton R., to Phillips Petroleum Company. Double-wall blow molded carton. 3,904,066, Cl. 220-7.000.

Winkler, Robert D. Fertilizer applicator tool. 3,903,815, Cl. 111-1.000.

Winnebago Industries, Inc.: *See—*
Bainter, Huston K.; and Nerem, Marvin E., 3,903,663.

Wintz, Paul A.; Sergo, John R., Jr.; and Song, Ching-Long, to North Electric Company. Direct digital logarithmic encoder. 3,905,028, Cl. 340-347.0AD.

Wise, John J.: *See—*
Whyte, Thaddeus E., Jr.; and Wise, John J., 3,904,508.

Wise, Larry E.: *See—*
Davis, Michael I.; Loffredo, John M.; Wise, Larry E.; and Rickard, Patrick L., 3,905,025.

Wistrand, John: *See—*
Montgomery, Joseph; and Wistrand, John, 3,903,944.

Wochnowski, Waldemar, to Hauni-Werke Korber & Co., KG. Method and apparatus for manipulating tobacco. 3,903,901, Cl. 131-21.00R.

Wolf, Didier Albert: *See—*
Leyrat, Pierre Jean; and Wolf, Didier Albert, 3,903,973.

Wolf, Lajos: *See—*
Mago nee Karacsony, Erzebet; Balogh, Tibor; Uskert nee Dievald, Emilia; Borsi, Jozsef; and Wolf, Lajos, 3,904,633.

Wolfe, Kenneth Roy; and Clarke, Maurice George, to Thorn Electrical Industries Limited. Manufacture of electrical devices having sealed envelopes. 3,904,908, Cl. 313-271.000.

Wolff Manufacturing Company: *See*—
Robinson, George L., 3,903,688.

Wolford, Lionel T.; and Wadsworth, Francis T., to Cities Service Oil Company. Flame-retardant composition. 3,904,700, Cl. 260-649.00R.

Wolt, John; Giacino, Christopher; Quinn, Alton Dewitt; Shuster, Edward J.; and Vinals, Joaquin F., to International Flavors & Fragrances Inc. Tobacco articles and compositions containing 1,2-cyclohexanedione and methods for producing same. 3,903,900, Cl. 131-17.00R.

Woodall-Duckham Limited: *See*—
Gosden, Derek Vernon; Marshall, Anthony Roland; and Robson, David George, 3,904,734.

Woodbridge, David D., Dr.: *See*—
Lund, Norman; Bialy, Karol J.; Mann, Leland A.; and Woodbridge, David D., Dr., 3,904,882.

Woodward, Charles D., to Texaco Inc. Method for recovering viscous petroleum. 3,903,967, Cl. 166-269.000.

Woollons, David John; and English, Michael John, to Kent Cambridge Medical Limited. Cardiac pacer. 3,903,897, Cl. 128-419.0PG.

Worth, Donald F.: *See*—
Elslager, Edward F.; and Worth, Donald F., 3,904,631.

Worthington, Hugh: *See*—
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Wortmann, Ernst; and Krakow, Heinz, to Blohm & Voss AG. Device for breaking off overflow sheets. 3,904,096, Cl. 225-97.000.

Wray, Raymond Patrick, to Imperial Chemical Industries Limited. Method of joining continuous strands. 3,904,458, Cl. 156-85.000.

Xerox Corporation: *See*—
Drummond, Peter R., 3,903,937.
Kidd, Wayne L.; and Corona, Stephen C., 3,904,290.
Moser, Rabin, 3,904,354.
Rees, James D.; and Critchlow, James A., 3,904,875.
Regensburger, Paul J.; and Jakubowski, James J., 3,904,407.
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Xmas, Inc.: *See*—
Burch, Charles A.; and West, Robert E., 3,904,878.

Xomox Corporation: *See*—
Haerr, Raymond H., 3,904,033.

Yager, William C., to United States of America, Navy. Flight simulator visual display system. 3,904,289, Cl. 353-122.000.

Yamada, Shigeki: *See*—
Chibata, Ichiro; Yamada, Shigeki; Yamamoto, Masao; and Sanematsu, Hisato, 3,904,646.

Yamada, Tomio: *See*—
Kano, Saburo; Nomura, Osami; Asada, Mitsuo; Ando, Meiki; Matsuda, Michihiko; Yamada, Tomio; Watanabe, Hitoshi; and Taniguchi, Takuzo, 3,904,639.

Yamaguchi, Tadashi; Hoshi, Hiroshi; Hirakawa, Michio; and Watanabe, Isao, to Lion Yushi Kabushiki Kaisha. Method for grafting organic polymers onto inorganic colloidal material. 3,904,568, Cl. 260-29.60M.

Yamaguchi, Yukio: *See*—
Moriguti, Kazuo; Yamaguchi, Yukio; and Suzuki, Mutuo, 3,904,311.

Yamamoto, Etsuji: *See*—
Fuki, Ichiro; Shimizu, Shosaku; Yamamoto, Etsuji; and Yoshida, Masahiko, 3,903,963.

Yamamoto, Izuru: *See*—
Yamamoto, Ryo; Yamamoto, Izuru; and Yoshizawa, Takumi, 3,904,780.

Yamamoto, Kazumasa: *See*—
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Yamamoto, Masao: *See*—
Chibata, Ichiro; Yamada, Shigeki; Yamamoto, Masao; and Sanematsu, Hisato, 3,904,646.

Yamamoto, Nobuyuki: *See*—
Komatsu, Noboru; Suzuki, Takatoshi; Yamamoto, Nobuyuki; and Tsuzuki, Yukikazu, 3,904,403.

Yamamoto, Ryo; Yamamoto, Izuru; and Yoshizawa, Takumi, to Suntory Ltd.; and Shiono Koryo Kaisha Ltd. Method for giving and increasing the flavor resembling to dairy product. 3,904,780, Cl. 426-534.000.

Yamasaki, Nobuyuki: *See*—
Sonenberg, Martin; and Yamasaki, Nobuyuki, 3,904,753.

Yanagawa, Nobuyuki, to Ricoh Co., Ltd. Microreader having an automatic card selection and retrieval apparatus. 3,904,285, Cl. 353-27.000.

Yatagai, Shukuro; and Tamura, Katunori, to Japanese National Railways. Engage-disengage device for cargo-transfer means in mechanical cargo handling system of the load replacing type. 3,904,053, Cl. 214-310.000.

Yazawa, Masahide; and Okada, Tokio, to Polymer Processing Research Institute Ltd. Apparatus for shaping tubular film. 3,904,334, Cl. 425-71.000.

Yellin, Bernard. Terrarium and stand therefor. 3,903,642, Cl. 47-34.000.

Yeske, Laurel R., to J. I. Case Company. Steering system for vehicles. 3,903,983, Cl. 180-79.20C.

Yocum, Charles H. Pick-up element for oily contaminants. 3,904,528, Cl. 210-242.000.

Yokogawa, Syunzi, to Tokyo Shibaura Electric Co., Ltd. Multiple chip integrated circuits and method of manufacturing the same. 3,903,590, Cl. 29-577.000.

Yokoi, Gunpei, to Nintendo Co., Ltd. Clay shooting simulation system. 3,904,204, Cl. 273-101.100.

Yoshida, Masahiko: *See*—
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Yoshioka, Tsunemi: *See*—
Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Yoshioka, Tsunemi; Kamizono, Tetsushi; and Onogi, Seiji, 3,904,565.

Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Nakanishi, Michio; Tahara, Tetsuya; Araki, Kazuhiko; and Shiroki, Masami, 3,904,641.

Yoshiura, Hirohisa; Arai, Toshiharu; Miyake, Masao; Yoshioka, Tsunemi; Kamizono, Tetsushi; and Onogi, Seiji, to Mitsubishi Chemical Industries Ltd. Polyolefin composition. 3,904,565, Cl. 260-23.00H.

Yoshizawa, Masayuki; Araki, Kengo; Koide, Atsushi; and Matsuoka, Yoshitaka, to Eisai Co., Ltd. Process for preparing pancreatic elastase. 3,904,479, Cl. 195-66.00R.

Yoshizawa, Takumi: *See*—
Yamamoto, Ryo; Yamamoto, Izuru; and Yoshizawa, Takumi, 3,904,780.

Young, John S.: *See*—
Boucek, Richard A.; and Young, John S., 3,905,024.

Young, Robert A. Helium resonance lamp and a leak detection system using the lamp. 3,904,907, Cl. 313-201.000.

Young, Robert W.; and Graf, Robert E., to American Optical Corporation. Absorptive glass. 3,904,425, Cl. 106-52.000.

Yu, Ruey J.: *See*—
Van Scott, Eugene J.; and Yu, Ruey J., 3,904,766.

Yumde, Yasufumi; and Furuhata, Takashi, to Hitachi, Ltd. System for band conversion of color picture signal. 3,905,039, Cl. 358-11.000.

Yusawa, Motoyasu: *See*—
Shimizu, Akira; Ichihashi, Kyozi; and Yusawa, Motoyasu, 3,904,730.

Zahnradfabrik Friedrichshafen Aktiengesellschaft: *See*—
Hamma, Karlmann, 3,903,756.

Zander, Claus-Peter: *See*—
Jeschke, Willie; and Zander, Claus-Peter, 3,903,796.

Zane, Ronald S. O.; and Mendell, Lester W., Jr. Article with movable appendages. 3,903,579, Cl. 29-183.000.

Zegers, Theodoor W.; Goldberger, William M.; Jepsen, Tage L. B.; Lee, Harley C.; and Pearson, Edward P., to Basic Incorporated. Segregation roast process for the recovery of nickel from lateritic ore. 3,904,400, Cl. 75-82.000.

Zehr, William J.: *See*—
Lisciani, Constantine; and Zehr, William J., 3,904,070.

Zeman, Kenneth P.: *See*—
Cardin, Robert A.; and Zeman, Kenneth P., 3,904,317.

Zenith Radio Corporation: *See*—
Palac, Kazimir, 3,904,914.
Schwartz, James W., 3,904,923.

Zetlin, Lev, to Lev Zetlin Associates, Inc. Structural floor system accomodating multi-directional ducts. 3,903,667, Cl. 52-227.000.

Zeuner, Kenneth W., to Control Concepts, Inc. Two stage solenoid operated valve assembly with relief function. 3,903,919, Cl. 137-489.000.

Zibilich, Joseph L.: *See*—
Hamrick, Oliver Henry, Jr.; Zibilich, Joseph L.; and Cwirzen, Casimir, 3,904,936.

Zid, Vladimir: *See*—
Horeni, Bohumir; Zid, Vladimir; Neckar, Bohuslav; and Prochazka, Jan, 3,903,714.

Ziefle, Martin, to Bizerba-Werke Wilhelm Kraut KG. Mechanical scale and method of calibrating the same. 3,903,976, Cl. 177-164.000.

Zilken, Hans-Joachim: *See*—
Messner, Rudolf; and Zilken, Hans-Joachim, 3,903,902.

Zimmermann, Norbert: *See*—
Krauss, Otto; Eder, Hans; Niederhametner, Peter; Richter, Arend; and Zimmermann, Norbert, 3,904,010.

Zipay, Michael: *See*—
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Zirino, Alberto: *See*—
Lieberman, Stephen H.; and Zirino, Alberto, 3,904,487.

Zoecon Corporation: *See*—
Henrick, Clive A.; and Siddall, John B., 3,904,662.

Zorn, Bruno; Noll, Klaus; Oertel, Harald; and Traubel, Harro, to Bayer Aktiengesellschaft. Process for the production of polyurethane coatings. 3,904,796, Cl. 427-390.000.

Zuercher, Klaus Paul Ernst: *See*—
Goerling, Paul Martin; and Zuercher, Klaus Paul Ernst, 3,904,777.

Zwisler, Oswald; and Biel, Hans, to Behringwerke Aktiengesellschaft. Process for isolating a fibrin stabilizing factor from human placenta. 3,904,751, Cl. 424-105.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 9TH DAY OF SEPTEMBER, 1975

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Beckman Instruments, Inc.: *See*—
Zichis, Joseph, Re. 28,548.
Clark, P.: *See*—
Pacheco, Francisco, Re. 28,547.
Ebert, Michael: *See*—
Pacheco, Francisco, Re. 28,547.
Girone, C. J.: *See*—
Pacheco, Francisco, Re. 28,547.
Kalil, E. J.: *See*—
Pacheco, Francisco, Re. 28,547.
Pacheco, Francisco, to Ebert, Michael; Kalil, E. J.; Rosen, A.; Clark, P.; and Girone, C. J., a part interest to each. Gas-operated internal combustion engine. Re. 28,547, Cl. 123-3.000.
Rosen, A.: *See*—
Pacheco, Francisco, Re. 28,547.
Zichis, Joseph, to Beckman Instruments, Inc. Method and reagents for the diagnosis of viral diseases. Re. 28,548, Cl. 424-12.000.

LIST OF PLANT PATENTEES

Jackson and Perkins Co.: *See*—
Warriner, William A. 3,779.
Lester, Donald T.: *See*—
Smalley, Eugene B., and Lester. 3,780.
Smalley, Eugene B., and D. T. Lester, to Wisconsin Alumni Research Foundation. Elm tree. 3,780, 9–9–75, Cl. 51.
Warriner, William A., to Jackson and Perkins Co. Rose plant. 3,779, 9–9–75, Cl. 20.
Wisconsin Alumni Research Foundation: *See*—
Smalley, Eugene B., and Lester. 3,780.

LIST OF DESIGN PATENTEES

AG-Chem Equipment Co., Inc.: *See*—
Scheffler, Edward D., Jr. 236,723.
Scheffler, Edward D., Jr., and Fish. 236,724.
American Greetings Corp.: *See*—
Wilson, Thomas A. 236,660.
Amerock Corp.: *See*—
Clayton, Laverne E. 236,682.
Tegner, Raymond U. H. 236,683.
American Hospital Supply Corp.: *See*—
Pilger, Nicholas J., and Ryan. 236,677.
Anderson, Walter C., to General Electric Co. Hand-held hair dryer. 236,763, 9–9–75, Cl. D86—10.
Atari, Inc.: *See*—
Bushnell, Nolan K. 236,740.
Cheng, Regan L., and Takaichi. 236,738.
Faraco, George. 236,738.
Atkins, Herbert A., to Beecham Group Ltd. Combined bottle and dispensing cap. 236,686, 9–9–75, Cl. D9—130.
Augusztiny, Arpad P.: *See*—
Baker, Dwight C. and Augusztiny. 236,703.
Avolio, Donald R., to Xerox Corp. Developer mix storage container. 236,694, 9–9–75, Cl. D9—216.
Baker, Dwight C., and A. P. Augusztiny. All-terrain vehicle. 236,703, 9–9–75, Cl. D12—1.
Baker, Mark P. Audio-visual projector for conveying information. 236,720, 9–9–75, Cl. D19—60.
Batesville Casket Co., Inc.: *See*—
Wettering, Carl A. 236,764.
Wettering, Carl A. 236,765.
Beecham Group Ltd.: *See*—
Atkins, Herbert A. 236,686.
Bernard, Maurice: *See*—
Gibian, Richard, and Bernard. 236,693.
Brine, Peter J.: *See*—
Brine, William H., and P. J. 236,737.
Brine, William H., and P. J. Lacrosse stick head. 236,737, 9–9–75, Cl. D34—5.
Brown, Robert C., Sr. Key holder. 236,760, 9–9–75, Cl. D87—8.
Buck, David L., and A. M. Mills, to Dunlop Ltd. Tire for a vehicle wheel. 236,710, 9–9–75, Cl. D12—144.
Burrett, Michael C. Safety device for motorcycle handlebars. 236,711, 9–9–75, Cl. D12—155.
Bushnell, Nolan K., to Atari, Inc. Game cabinet. 236,740, 9–9–75, Cl. D34—5.
Bush, Robert R., to True Temper Corp. Golf club shaft or similar article. 236,735, 9–9–75, Cl. D34—5.
Butterfield, Max E.: *See*—
Wait, John D., Jr., Butterfield, Van Rossem, and Olt, Jr. 236,746.
Caterpillar Tractor Co.: *See*—
Wait, John D., Jr., Butterfield, Van Rossem, and Olt, Jr. 236,746.
CBS Inc.: *See*—
Moustakas, Matthew. 236,743.
Cheng, Regan L., and P. L. Takaichi, to Atari, Inc. Game cabinet. 236,738, 9–9–75, Cl. D34—5.
Clark, C. & J., Ltd.: *See*—
Cotton, Malcolm J. 236,662.
Cotton, Malcolm J. 236,663.
Moore, Ronald. 236,664.
Clayton, Laverne E., to Amerock Corp. Escutcheon. 236,682, 9–9–75, Cl. D8—179.
Clement, Carl J., W. K. English, and F. T. Stengen, to Xerox Corp. Cursor position controller. 236,733, 9–9–75, Cl. D26—13.
Cohen, Morton, to Security Instruments Inc. Electrical terminal block for burglar alarm system. 236,702, 9–9–75, Cl. D10—106.
Cole, Roger. Electrical plug. 236,732, 9–9–75, Cl. D26—1.
Cotton, Malcolm J., to C. & J. Clark Ltd. Shoe. 236,662, 9–9–75, Cl. D2—268.
Cotton, Malcolm J., to C. & J. Clark Ltd. Shoe. 236,663, 9–9–75, Cl. D2—268.
Covey, Laird F., to The Stanley Works. Chalk line reel. 236,699, 9–9–75, Cl. D10—61.
Covey, Laird F., to The Stanley Works. Tape measure. 236,701, 9–9–75, Cl. D10—72.
Dart Industries Inc.: *See*—
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Darnell, Arne P., to Perstorp AB. Record-stand. 236,675, 9–9–75, Cl. D6—185.
Daum, Gerald R., to Texas Instruments Inc. Telephone housing. 236,734, 9–9–75, Cl. D26—14.
DeMassacre, Guy, to Hutchinson-Mapa. Boot. 236,665, 9–9–75, Cl. D2—275.
Dunlop Ltd.: *See*—
Buck, David L., and Mills. 236,710.
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Draghi, James A., to M. H. Rhodes, Inc. Bell timer. 236,697, 9–9–75, Cl. D10—40.
Draghi, James A., to M. H. Rhodes, Inc. Bell timer. 236,698, 9–9–75, Cl. D10—40.
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Ehrman, Ernst. Collapsible table. 236,673, 9–9–75, Cl. D6—146.
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Faraco, George, to Atari, Inc. Game cabinet. 236,738, 9–9–75, Cl. D34—5.
Fish, Laurence H.: *See*—
Scheffler, Edward D., Jr., and Fish. 236,724.
Franzen, Ingemar, to ITT Industries, Inc. Submersible pump. 236,756, 9–9–75, Cl. D65—1.
Frost, George H. Lavatory. 236,725, 9–9–75, Cl. D23—58.
Fuentes, Constancio S. Paving machine or similar apparatus. 236,745. 9–9–75, Cl. D40—5.
Funahashi, Takaji. Cylindrical stamp. 236,752, 9–9–75, Cl. D64—10.
Funahashi, Takaji. Rectangular stamp. 236,754, 9–9–75, Cl. D64—10.

Geiger, Charles L. Combined two-way level and nameplate for trailers. 236,700, 9–9–75, Cl. D10—69.
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Gibian, Richard, and M. Bernard. Packaging tray for candy. 236,693, 9–9–75, Cl. D9—189.
Gilbert, Evalin S. Table. 236,674, 9–9–75, Cl. D6—177.
Goodwin, Christine. Toy shop front and side. 236,742, 9–9–75, Cl. D34—15.
Graviner (Colnbrook) Ltd.: *See*—
Hebblethwaite, Peter B. 236,684.
Green, James D. M., and T. R. Turner, Jr. Wall clock. 236,696, 9–9–75, Cl. D10—17.
Green, James D. M., and T. R. Turner, Jr. Candle holding sconce or the like. 236,747, 9–9–75, Cl. D48—2.
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Haase, Donald A., to Mobil Oil Corp. Covered compartmented food tray. 236,692, 9–9–75, Cl. D9—185.
Harris, Jerrold B. Dental floss holder or similar article. 236,728, 9–9–75, Cl. D24—1.
Hebblethwaite, Peter B., to Graviner (Colnbrook) Ltd. Dispenser for liquids or fluidised powders. 236,684, 9–9–75, Cl. D9—9.
Holliday, Daniel E., to Rotary Marine Corp. Jacketed exhaust pipe for marine internal combustion engines. 236,712, 9–9–75, Cl. D12—194.
Holt, Jorden, to Nordisk Ventilator Co. Aktieselkab. Injection nozzle rim for ventilating apparatus. 236,726, 9–9–75, Cl. D23—163.
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Jaques, Michael J. Steel tape and wire puller. 236,680, 9–9–75, Cl. D8—14.
Kahn, Richard. Wall hung storage unit. 236,672, 9–9–75, Cl. D6—127.
Kaufman, Jack W. Combined brush and sponge. 236,666, 9–9–75, Cl. D4—17.
Kondo, Ryozo. Air-pump for aquarium. 236,755, 9–9–75, Cl. D65—1.
Konzorr, Hubert J., to Union Sils, van de Loo & Co. Kom. Ges. Reflective bicycle pedal. 236,708, 9–9–75, Cl. D12—125.
Lanham, Samuel E.: *See*—
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Macy, Frank D., to Tran-Sit Bench Systems Inc. Outdoor bench. 236,669, 9–9–75, Cl. D6—59.
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Murray, Alan J.: *See*—
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Peters, Philip H., Jr., and J. L. Matrone, to Environment/One Corp. Combined cabinet and electric counter top cooking unit. 236,679, 9–9–75, Cl. D7—121.
Pilger, Nicholas J., and J. E. Ryan, to American Hospital Supply Corp. Food serving tray. 236,677, 9–9–75, Cl. D7—38.
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Ponzoni, Jaures. Bed. 236,671, 9–9–75, Cl. D6—80.
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Smith, Ralph L. Roller skate. 236,741, 9–9–75, Cl. D34—14.
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CLASSIFICATION OF PATENTS

ISSUED SEPTEMBER 9, 1975

NOTE.—First number, class; second number, subclass; third number, patent number

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31AB 3,904,019
40 3,904,020
53 3,904,021
85 3,904,022
106 3,904,023
119 3,904,024
136 3,904,025
172 3,904,026
180 3,904,027
195 3,904,028

CLASS 200
61.58R 3,904,841
81R 3,904,842
153F 3,904,843
157 3,904,844

CLASS 203
52 3,904,484
56 3,904,485

CLASS 204
1T 3,904,486
3,904,487
5 3,904,488
15 3,904,489
16 3,904,490
28 3,904,491
38B 3,904,492
43G 3,904,493
67 3,904,494
93 3,904,495
98 3,904,496
105R 3,904,497
157.1S 3,904,498
159.15 3,904,499
162R 3,904,500
164 3,904,501
181 3,904,502
192 3,904,503
286 3,904,504
298 3,904,505
3,904,506

CLASS 206
45.34 3,904,029
319 3,904,030
320 3,904,039
328 3,904,031
347 3,904,032
349 3,904,033
378 3,904,034
379 3,904,035
427 3,904,036
447 3,904,038
493 3,904,040
534 3,904,037

CLASS 208
14 3,904,507
17 3,904,508
113 3,904,509
140 3,904,510
177 3,904,511
182 3,904,512
264 3,904,513
340 3,904,514

CLASS 209
3 3,904,515
74M 3,904,516
441 3,904,517

CLASS 210
11 3,904,518
23 3,904,519
44 3,904,521
58 3,904,522
79 3,904,523
94 3,904,524
150 3,904,525
196 3,904,526
198C 3,904,527
242 3,904,528

CLASS 211
72 3,904,041

CLASS 214
1CM 3,904,042
6BA 3,904,045
6DK 3,904,046
6A 3,904,043
6M 3,904,044
3,904,047
27 3,904,048
83.34 3,904,049
89 3,904,050
138R 3,904,051
146E 3,904,052
310 3,904,053
317 3,904,054
514 3,904,055
519 3,904,056
622 3,904,057

CLASS 215
6 3,904,058
247 3,904,059
251 3,904,060
252 3,904,061
3,904,062
318 3,904,063

CLASS 219
124 3,904,845
135 3,904,846
213 3,904,847
267 3,904,848
299 3,904,849
374 3,904,851
442 3,904,852
528 3,904,850

CLASS 220
1.5 3,904,064
2.1R 3,904,065
7 3,904,066
9LG 3,904,067
63R 3,904,068
66 3,904,069
88R 3,904,070
233 3,904,071
288 3,904,072
318 3,904,073
339 3,904,074

CLASS 221
5 3,904,075
67 3,904,076
175 3,904,077

CLASS 222
1 3,904,078
2 3,904,079
23 3,904,080
63 3,904,081
70 3,904,082
82 3,904,083
105 3,904,084
131 3,904,085
146HE 3,904,086
193 3,904,087
402.11 3,904,088

CLASS 223
30 3,904,089
37 3,904,090

CLASS 224
2B 3,904,091
29R 3,904,092
42.1F 3,904,094
42.21 3,904,093

CLASS 225
56 3,904,095
97 3,904,096
103 3,904,097

CLASS 226
33 3,904,099
97 3,904,098

CLASS 228
8 3,904,100
121 3,903,585
173 3,904,101
180 3,904,102
190 3,903,586

CLASS 229
2.5 3,904,103
3.5 3,904,104
15 3,904,105
31R 3,904,106
62.5 3,904,107

CLASS 232
35 3,904,108

CLASS 233
2 3,904,109

CLASS 235
51 3,904,853
54F 3,904,854
61.11E 3,904,110
61.6K 3,904,855
150.21 3,904,856
151.1 3,904,857
151.11 3,904,858
151.31 3,904,859
153AC 3,904,860
3,904,861
156 3,904,862
3,904,863

CLASS 236
93 3,904,111

CLASS 238
84 3,904,112
264 3,904,113
349 3,904,114

CLASS 239
8 3,904,115
127 3,904,116
146 3,904,117
165 3,904,118
201 3,904,120
208 3,904,121
223 3,904,122
271 3,904,123
350 3,904,124
405 3,904,119
452 3,904,125
502 3,904,126
562 3,904,127
587 3,904,128
650 3,904,129

CLASS 240
7.1R 3,904,864
10L 3,904,865
3,904,866
10.6R 3,904,867

CLASS 241
30 3,904,130
46.02 3,904,131
59 3,904,132
69 3,904,133
73 3,904,134
86 3,904,135
186A 3,904,136
259.1 3,904,137
286 3,904,138
3,904,139

CLASS 242
43.1 3,904,140
47.12 3,904,141
58.3 3,904,142
72B 3,904,143
3,904,144
75.2 3,904,145
107.4 3,904,146
156.2 3,904,147
182 3,904,148
198 3,904,149
199 3,904,150

CLASS 244
42CC 3,904,151
43 3,904,152
50 3,904,153
110R 3,904,154
118R 3,904,155
3,904,156

CLASS 246
63C 3,904,157

CLASS 248
23 3,904,158
3,904,159
27 3,904,160
43 3,904,161
223 3,904,162
358R 3,904,163
362 3,904,164

CLASS 249
67 3,904,165
197 3,904,166

CLASS 250
201 3,904,868
204 3,904,869
3,904,870
211J 3,904,871
226 3,904,872
227 3,904,873
273 3,904,876
314 3,904,874
317 3,904,875
3,904,877
321 3,904,878
338 3,904,879
343 3,904,880
369 3,904,530
390 3,904,881
437 3,904,882
444 3,904,531
483 3,904,532
531 3,904,529

CLASS 251
14 3,904,167
30 3,904,168
86 3,904,169
152 3,904,170
159 3,904,171
305 3,904,172
306 3,904,173
331 3,904,174
3,904,175
339 3,904,176

CLASS 252
8.8 3,904,533
36 3,904,534
46.6 3,904,535
46.7 3,904,536
47.5 3,904,537
62 3,904,539
62.51 3,904,538
62.54 3,904,540
63.2 3,904,541
171 3,904,542
174 3,904,543
201.2P 3,904,545
301.2W 3,904,544
301.45 3,904,546
414 3,904,547
417 3,904,548
3,904,549
437 3,904,550
455R 3,904,551
458 3,904,552
465 3,904,553
466PT 3,904,554
503 3,904,555
522 3,904,556

CLASS 254
103 3,904,177

CLASS 259
1R 3,904,178
191 3,904,179

CLASS 260
2.5BD 3,904,557
2.5L 3,904,558
19R 3,904,559
22CB 3,904,562
3,904,563
22A 3,904,560
22R 3,904,561
23XA 3,904,564
23H 3,904,565
23.7M 3,904,566
23.7R 3,904,567
29.6TA 3,904,570
29.6M 3,904,568
29.6N 3,904,569
31.2MR 3,904,572
31.2R 3,904,571
31.8T 3,904,573
32.6R 3,904,574
32.8R 3,904,575
33.8UA 3,904,576
37N 3,904,577
40P 3,904,578
42.46 3,904,579
42.47 3,904,580
45.8N 3,904,581
3,904,582
46.5R 3,904,583
47UA 3,904,584
77.5BB 3,904,587
78A 3,904,589
78.5R 3,904,588
79.3R 3,904,590
79.5B 3,904,591
83.3 3,904,592
112.5 3,904,593
3,904,594
132 3,904,595
187 3,904,596
210K 3,904,597
210.5 3,904,598
3,904,599
231A 3,904,600

250
3,904,868
3,904,869
3,904,870
3,904,871
3,904,872
3,904,873
3,904,876
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3,904,880
3,904,530
3,904,881
3,904,882
3,904,531
3,904,532
3,904,529

251
3,904,167
3,904,168
3,904,169
3,904,170
3,904,171
3,904,172
3,904,173
3,904,174
3,904,175
3,904,176

252
3,904,533
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3,904,541
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254
3,904,177

259
3,904,178
3,904,179

260
3,904,557
3,904,558
3,904,559
3,904,562
3,904,563
3,904,560
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3,904,568
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3,904,572
3,904,571
3,904,573
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3,904,582
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3,904,599
3,904,600

233.3R 3,904,601
239BD 3,904,603
239E 3,904,602
239.1 3,904,604
3,904,605
3,904,606
3,904,607
239.3A 3,904,608
3,904,609
239.3R 3,904,610
239.55R 3,904,611
240J 3,904,612
240.8 3,904,613
241 3,904,614
243C 3,904,615
3,904,616
3,904,618
243R 3,904,617
246B 3,904,619
247.1L 3,904,620
247.2B 3,904,621
247.7S 3,904,622
249.6 3,904,623
251P 3,904,624
251R 3,904,625
256.4H 3,904,626
257 3,904,627
268PC 3,904,630
268TR 3,904,631
268N 3,904,629
268R 3,904,628
285 3,904,632
285.5 3,904,633
3,904,634
293.86 3,904,635
294.8A 3,904,637
294.8F 3,904,636
306 3,904,638
306.7E 3,904,639
306.8D 3,904,640
308R 3,904,641
309.2 3,904,642
3,904,643
309.5 3,904,644
326.14T 3,904,646
326.5B 3,904,645
328 3,904,647
340.9 3,904,648
343.3 3,904,649
345.2 3,904,650
3,904,651
346.8 3,904,652
3,904,653
347.2 3,904,654
347.8 3,904,655
348A 3,904,658
348C 3,904,657
348.5R 3,904,656
369 3,904,659
380 3,904,660
404.5 3,904,661
410 3,904,662
429R 3,904,663
453AM 3,904,666
453A 3,904,665
453R 3,904,664
465G 3,904,667
465.5A 3,904,668
471C 3,904,669
472 3,904,670
473R 3,904,671
482C 3,904,673
485F 3,904,674
486AC 3,904,672
488F 3,904,675
499 3,904,676
501Z 3,904,677
505R 3,904,678
514D 3,904,679
519 3,904,680
3,904,681
520 3,904,682
3,904,683
534R 3,904,585
535P 3,904,684
537N 3,904,685
551S 3,904,686
556N 3,904,586
564E 3,904,687
566A 3,904,689
566R 3,904,688
570.5P 3,904,690
576 3,904,691
586P 3,904,692
586R 3,904,693
612R 3,904,694
613D 3,904,695
613R 3,904,696
614F 3,904,697
617R 3,904,698
640 3,904,699
649R 3,904,700
653.6 3,904,701
668B 3,904,702
669R 3,904,703
680B 3,904,704

857TW 3,904,705
858 3,904,706
873 3,904,707
878R 3,904,708
3,904,709
949 3,904,710
968 3,904,711

CLASS 261
34A 3,904,712
64R 3,904,722
90 3,904,713
91 3,904,714

CLASS 264
3R 3,904,715
29 3,904,716
34 3,904,717
39 3,904,718
40 3,904,719
45.5 3,904,720
46.5 3,904,721
71 3,904,723
3,904,724
89 3,904,725
117 3,904,726
3,904,727
140 3,904,728
153 3,904,729
171 3,904,730
242 3,904,731
341 3,904,732

CLASS 266
34PP 3,904,180

CLASS 267
35 3,904,181
64R 3,904,182
3,904,183

CLASS 269
102 3,904,184
291 3,904,185

CLASS 270
61F 3,904,186
83 3,904,187

CLASS 271
3 3,904,188
95 3,904,189
99 3,904,190
150 3,904,191
186 3,904,192

CLASS 272
3 3,904,193
49 3,904,194
58 3,904,195
72 3,904,196
74 3,904,197
81 3,904,198

CLASS 273
29A 3,904,199
33 3,904,200
61R 3,904,201
73E 3,904,202
85R 3,904,203
101.1 3,904,204
106A 3,904,205
131AC 3,904,206
135R 3,904,207
146 3,904,208
176A 3,904,209

CLASS 274
1A 3,904,210

CLASS 277
32 3,904,211
126 3,904,212
229 3,904,213

CLASS 279
4 3,904,214

CLASS 280
11.2 3,904,215
43 3,904,216
47.25 3,904,217
79.2 3,904,218
124F 3,904,220
124R 3,904,219
150AB 3,904,221
3,904,222
150B 3,904,223
150.5 3,904,224
478R 3,904,225
486 3,904,226

CLASS 281
29 3,904,227

CLASS 285
156 3,904,228

CLASS 290
50 3,904,883

CLASS 292
29 3,904,229
49 3,904,230

CLASS 294
67DA 3,904,231
88 3,904,232

92 3,904,233
106 3,904,234
3,904,235

CLASS 296
1S 3,904,236
28F 3,904,237
78.1 3,904,238
137J 3,904,239

CLASS 297
85 3,904,240
391 3,904,241
452 3,904,242
457 3,904,243

CLASS 299
34 3,904,244
37 3,904,245
81 3,904,246
91 3,904,247

CLASS 302
66 3,904,248

CLASS 303
20 3,904,249
21BE 3,904,251
21F 3,904,250
22R 3,904,252
3,904,253

CLASS 307
10SB 3,904,884
10R 3,904,885
89 3,904,886
139 3,904,887
205 3,904,888
212 3,904,889
231 3,904,890
238 3,904,891
252F 3,904,892
254 3,904,893
260 3,904,894
288 3,904,895

CLASS 308
3.8 3,904,254
5R 3,904,255
159 3,904,256
237R 3,904,257

CLASS 310
8.1 3,904,896
12 3,904,897
3,904,898
3,904,899
3,904,900
52 3,904,901
162 3,904,902

CLASS 312
6 3,904,258
111 3,904,259

CLASS 313
99 3,904,903
113 3,904,904
184 3,904,905
188 3,904,906
201 3,904,907
271 3,904,908
318 3,904,909
325 3,904,910
366 3,904,911
408 3,904,912
449 3,904,913
482 3,904,914
484 3,904,915
493 3,904,916

CLASS 315
5.39 3,904,917
13C 3,904,918
39.61 3,904,919
78 3,904,920
101 3,904,921
151 3,904,922
169TV 3,904,923
3,904,924
171 3,904,925
378 3,904,926
408 3,904,927
410 3,904,928

CLASS 316
20 3,904,260

CLASS 317
2R 3,904,929
3 3,904,930
16 3,904,931
61 3,904,932
100 3,904,933
101D 3,904,934
107 3,904,935
118 3,904,936
120 3,904,937
123 3,904,938
230 3,904,939
262R 3,904,940

CLASS 318
135 3,904,941
3,904,942
395 3,904,943

578 3,904,944
593 3,904,945
685 3,904,946

CLASS 320
2 3,904,947
13 3,904,948

CLASS 321
9R 3,904,949
27R 3,904,950

CLASS 323
4 3,904,951
24 3,904,952
44R 3,904,953
48 3,904,954

CLASS 324
17 3,904,955
34S 3,904,956
40 3,904,957
51 3,904,958
57SS 3,904,959
65P 3,904,960
125 3,904,961
158D 3,904,962

CLASS 325
38B 3,904,963
67 3,904,964
141 3,904,965
163 3,904,966
390 3,904,967
408 3,904,968
478 3,904,969

CLASS 328
167 3,904,970

CLASS 330
22 3,904,972
3,904,973
26 3,904,974
29 3,904,971
3,904,975
30D 3,904,976
51 3,904,977
109 3,904,978
207P 3,904,979

CLASS 331
4 3,904,980
94.5C 3,904,983
94.5G 3,904,985
3,904,986
94.5K 3,904,981
94.5L 3,904,982
94.5M 3,904,984
94.5Q 3,904,987
111 3,904,988
113R 3,904,989

CLASS 333
9 3,904,990
10 3,904,991
18 3,904,992
22R 3,904,993
31R 3,904,994
33 3,904,995
72 3,904,996
84M 3,904,997

CLASS 335
52 3,904,999

CLASS 336
65 3,905,000
94 3,905,001
136 3,905,002

CLASS 337
54 3,905,003
75 3,904,998
104 3,905,004

CLASS 338
2 3,905,005
21 3,905,006

CLASS 339
17CF 3,904,262
17F 3,904,261
18C 3,904,263
94C 3,904,264
103M 3,904,265
198R 3,904,266

CLASS 340
3E 3,905,007
4R 3,905,008
6R 3,905,009
18NC 3,905,010
29 3,905,011
48 3,905,012
52D 3,905,013
3,905,014
61 3,905,015
70 3,905,016
95 3,905,017
146.3MA 3,905,018
146.3P 3,905,019
147P 3,905,020
172.5 3,905,021
3,905,022
3,905,023

3,905,024
3,905,025
174PA 3,905,026
304 3,905,027
347AD 3,905,028
347DA 3,905,030
347DD 3,905,029

CLASS 343
5CM 3,905,031
6.5R 3,905,035
7.3 3,905,032
7.7 3,905,033
9 3,905,034

CLASS 350
12 3,904,267
96WG 3,904,268
3,904,270
96C 3,904,269
112 3,904,271
150 3,904,272
151 3,904,273
161 3,904,274
175FS 3,904,275
252 3,904,276
3,904,277
255 3,904,278
257 3,904,279

CLASS 351
1 3,904,280
159 3,904,281
174 3,904,282

CLASS 352
72 3,904,283
78R 3,904,284

CLASS 353
27 3,904,285
71 3,904,286
114 3,904,287
118 3,904,288
122 3,904,289

CLASS 355
8 3,904,290
19 3,904,291
100 3,904,292

CLASS 356
118 3,904,293
124 3,904,294
167 3,904,295
246 3,904,296

CLASS 357
22 3,905,036
60 3,905,037
70 3,905,038

CLASS 358
11 3,905,039

CLASS 360
59 3,905,040
62 3,905,041
71 3,905,042
77 3,905,043
122 3,905,044

CLASS 401
216 3,904,297

CLASS 403
93 3,904,298
157 3,904,299
203 3,904,300
259 3,904,301

CLASS 404
68 3,904,302
3,904,303
69 3,904,304

CLASS 415
25 3,904,305
53 3,904,306
115 3,904,307
143 3,904,308
148 3,904,309
152 3,904,310
161 3,904,311
181 3,904,312

CLASS 416
20 3,904,313
135 3,904,314
160 3,904,315
218 3,904,316
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CLASS 417
199 3,904,318
200 3,904,319
269 3,904,320
283 3,904,321
310 3,904,322
334 3,904,323
355 3,904,324
512 3,904,325
571 3,904,326

CLASS 418
8 3,904,327

61A 3,904,328
99 3,904,329
100 3,904,330
111 3,904,331
115 3,904,332
132 3,904,333

CLASS 423
206T 3,904,733
236 3,904,734
243 3,904,735
251 3,904,736
252 3,904,737
328 3,904,738
400 3,904,739
403 3,904,740
462 3,904,741
554 3,904,742
567 3,904,743
652 3,904,744

CLASS 424
12 Re.28,548
22 3,904,745
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49 3,904,747
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89 3,904,750
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3,904,762
278 3,904,763
298 3,904,764
304 3,904,773
319 3,904,765
325 3,904,766

CLASS 425
71 3,904,334
80 3,904,335
115 3,904,336
128 3,904,337
145 3,904,338
162 3,904,339
297 3,904,340
382 3,904,341
384 3,904,342
472 3,904,343
3,904,344
501 3,904,345

CLASS 426
33 3,904,767
53 3,904,768
104 3,904,769
293 3,904,772
321 3,904,774
418 3,904,778
431 3,904,779
534 3,904,780
576 3,904,771
631 3,904,777
641 3,904,775
3,904,776
645 3,904,770

CLASS 427
2 3,904,781
12 3,904,782
29 3,904,346
54 3,904,783
82 3,904,784
120 3,904,785
122 3,904,752
194 3,904,786
220 3,904,787
232 3,904,788
253 3,904,789
261 3,904,790
277 3,904,791
304 3,904,792
369 3,904,793
375 3,904,794
3,904,795
390 3,904,796

CLASS 428
1 3,904,797
36 3,904,798
92 3,904,799
186 3,904,800
246 3,904,801
320 3,904,802
3,904,803
332 3,904,804
378 3,904,805
511 3,904,806

CLASS 431
1 3,904,347

95	3,904,348	256	3,904,350	CLASS 432		14	3,904,353	152	3,904,355	CLASS 444	
184	3,904,349	284	3,904,351	5	3,904,352	60	3,904,354	249	3,904,356	1	3,905,045

CLASSIFICATION OF DESIGNS

D2—	211	236,660		105	236,678	D10—	17	236,696		202	236,713	D26—	A	236,732		24R	236,749
	247	236,661		121	236,679		40	236,697	D13—	1H	236,714		13C	236,733	D55—	1B	236,750
	268	236,662	D8—	14	236,680			236,698		6	236,715		14A	236,734			236,751
		236,663		57	236,681		61	236,699			236,716	D34—	5CB	236,737	D61—		236,753
		236,664		179	236,682		69	236,700			236,717		GH	236,736	D64—	10	236,752
	275	236,665			236,683		72	236,701			236,718		GS	236,735			236,754
D4—	17	236,666	D9—	9	236,684		106	236,702	D19—	59	236,729		J	236,738	D65—	1R	236,755
D6—	1	236,667		56	236,685			236,719			236,730			236,739			236,756
	27	236,668		130	236,686	D12—	1	236,703			236,731			236,740	D67—	2	236,757
	59	236,669		142	236,687		15	236,704		60	236,720		14C	236,741	D86—	10A	236,762
	66	236,670			236,688		26	236,705		88	236,721		15AJ	236,743		F	236,761
	80	236,671		157	236,689		92	236,706	D22—	1	236,722		LL	236,742			236,763
	127	236,672		163	236,690		114	236,707	D23—		236,723		40	236,744	D87—	5	236,758
	146	236,673		185	236,691		125	236,708		40	236,724	D40—	5	236,745		R	236,759
	177	236,674			236,692		142	236,709		58	236,725			236,746		8	236,760
	185	236,675		189	236,693		144	236,710		163	236,726	D48—	2	236,747	D92—	1AB	236,764
	186	236,676		216	236,694		155	236,711	D24—	1D	236,727			236,748			236,765
D7—	38	236,677		245	236,695		194	236,712			236,728						

CLASSIFICATION OF PLANTS

P. —	20	3,779	P. —	51	3,780						

GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 3,903,699	3,903,958	3,904,682	3,904,119	3,904,825	3,904,178
2 : 3,904,155	3,903,965	3,904,698	3,904,214	3,904,920	3,904,184
3 : 3,904,262	3,903,988	3,904,715	3,904,218	3,904,995	3,904,210
4 : 3,903,600	3,904,023	3,904,717	3,904,270	3,905,007	3,904,266
3,903,876	3,904,027	3,904,720	3,904,277	3,905,025	3,904,271
3,904,326	3,904,060	3,904,779	3,904,291	13 : 3,903,798	3,904,365
3,904,784	3,904,064	3,904,797	3,904,307	3,903,807	3,904,497
3,904,935	3,904,087	3,904,801	3,904,312	3,903,954	3,904,515
3,904,988	3,904,088	3,904,841	3,904,315	3,904,036	3,904,524
5 : 3,904,109	3,904,092	3,904,868	3,904,410	3,904,105	3,904,569
3,905,038	3,904,094	3,904,891	3,904,425	3,904,152	3,904,623
6 : Re.28,548	3,904,110	3,904,892	3,904,436	3,904,180	3,904,640
3,903,551	3,904,120	3,904,943	3,904,530	3,904,431	3,904,686
3,903,579	3,904,151	3,904,948	3,904,549	3,904,793	3,904,743
3,903,581	3,904,163	3,904,949	3,904,645	3,904,836	3,904,769
3,903,603	3,904,185	3,904,954	3,904,666	3,905,013	3,904,771
3,903,604	3,904,197	3,904,959	3,904,731	16 : 3,905,016	3,904,775
3,903,606	3,904,198	3,904,964	3,904,760	17 : 3,903,563	3,904,814
3,903,609	3,904,199	3,904,966	3,904,817	3,903,575	3,904,914
3,903,616	3,904,201	3,904,981	3,904,821	3,903,594	3,904,923
3,903,649	3,904,208	3,904,983	3,904,848	3,903,623	3,904,936
3,903,684	3,904,234	3,904,993	3,904,852	3,903,625	3,904,969
3,903,688	3,904,244	3,905,018	3,904,858	3,903,627	3,905,002
3,903,692	3,904,254	3,905,026	3,904,865	3,903,640	3,905,017
3,903,694	3,904,258	3,905,029	3,904,883	3,903,642	3,905,024
3,903,698	3,904,261	3,905,031	3,904,946	3,903,646	18 : 3,903,561
3,903,711	3,904,269	8 : 3,903,560	3,904,958	3,903,655	3,903,593
3,903,719	3,904,272	3,903,583	3,904,974	3,903,708	3,903,656
3,903,735	3,904,273	3,903,586	10 : 3,904,358	3,903,720	3,903,679
3,903,736	3,904,281	3,903,808	3,904,518	3,903,737	3,903,755
3,903,760	3,904,343	3,903,875	3,904,574	3,903,738	3,903,893
3,903,764	3,904,370	3,904,148	3,904,588	3,903,751	3,903,933
3,903,781	3,904,371	3,904,352	3,904,667	3,903,784	3,903,999
3,903,782	3,904,380	3,904,869	3,904,706	3,903,787	3,904,082
3,903,783	3,904,384	3,904,870	3,904,725	3,903,814	3,904,169
3,903,803	3,904,404	3,904,873	3,904,806	3,903,815	3,904,226
3,903,816	3,904,461	3,904,977	11 : 3,903,806	3,903,824	3,904,316
3,903,827	3,904,487	9 : 3,903,554	3,903,945	3,903,883	3,904,383
3,903,831	3,904,489	3,903,567	12 : 3,903,653	3,903,890	3,904,428
3,903,837	3,904,509	3,903,578	3,903,677	3,903,904	3,904,480
3,903,845	3,904,517	3,903,687	3,903,678	3,903,905	3,904,491
3,903,872	3,904,535	3,903,727	3,903,696	3,903,924	3,904,605
3,903,873	3,904,539	3,903,770	3,903,700	3,903,960	3,904,615
3,903,881	3,904,545	3,903,793	3,903,869	3,904,003	3,904,618
3,903,909	3,904,584	3,903,882	3,904,012	3,904,018	3,904,626
3,903,912	3,904,594	3,903,944	3,904,041	3,904,051	3,904,757
3,903,922	3,904,611	3,903,989	3,904,091	3,904,055	3,904,847
3,903,925	3,904,647	3,904,011	3,904,121	3,904,059	3,905,028
3,903,929	3,904,649	3,904,017	3,904,161	3,904,070	19 : 3,903,645
3,903,937	3,904,662	3,904,061	3,904,327	3,904,071	3,903,663
3,903,953	3,904,674	3,904,075	3,904,791	3,904,098	3,903,742

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55 : 3,780

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